

Investigating The Gender Wage Gap In the Nigerian Labour Market: A Distributional Approach

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Abstract

This study investigates the gender wage gap in Nigeria by extending the focus of the existing literature in two ways. First, we apply an extension of the Oaxaca-Blinder decomposition that relies on recentred influence function (RIF) regressions to analyze the gender wage gap at all points along the wage distribution. Second, we investigate changes in the gender wage gap between 2003/2004 and 2018/2019. The results unambiguously show that there is a significant gender wage gap in favour of men in Nigeria. This gap is statistically significant at all points of the wage distribution. Over time, we find that most of the wage difference is significantly accounted for by the wage structure effect, while the composition effect accounted for the wage gap at the lower end of the wage distribution during 2018/19. We also found a general decline in the gender wage gap along the entire wage distribution. In 2018/19, the gap is bigger at the bottom than at the top of the wage distribution, which is evidence in favour of a sticky floor in the Nigerian labour market. In terms of the contributions of individual covariates, we found that urban residence, unionization, education, public sector employment, and wage employment in agriculture has a significant reducing effect on the wage gap in favour of women. To address the gender wage gap in Nigeria, policy should focus more on ways to improve human capital among women and ensuring women are not segregated in top positions at the workplace.

Key words: *gender wage gap, quantile, recentred influence function, Nigeria, Nigerian labour market*

JEL Codes: *C83; J08; J16; J21*

1. Introduction and Motivation

The issue of gender equality has become an important discourse that has shaped plans, policies and actions of governments and private organizations all over the world. Owing to this importance, the United Nations made it one of the 17 Sustainable Development Goals, with Goal 5 aiming to ensure that there is no discrimination against girls and women anywhere. However, the reverse seems to be the case in Nigeria as statistics show evidence of some gaps between males and females across some sectors of the economy. For example, Nigeria is ranked 38th globally and 11th in sub-Saharan Africa (SSA) in the economic participation and opportunity sub-index of the global gender gap index. According to the World Economic Forum (WEF, 2021), Nigerian women represent 65% of skilled professionals but account for only 30% of senior corporate leadership positions. Also, the educational attainment for women in Nigeria is lower when compared with males. There is also a gender gap in school enrolment rate with more male pupils being enrolled than females (NBS, 2021). Yet, some African countries such as Rwanda, South Africa and a few others have attained almost equal enrolment of both sexes in schools. Nigeria falls below these countries on this index (WEF, 2021).

Essentially, interest in the magnitude, pattern and causes of the gender wage gap has been growing, especially over the past two decades, both within and across countries, including in African countries (Ntuli and Kwenda, 2020). While labour unions across the globe have continued to push for higher wages, the issue of gender differences in earnings in the same country, occupation, industry and with similar characteristics (Metcalf, 2009; Mamiko, 2021) has continued to be of great interest to researchers, gender activists and international organizations. The results of the analysis of gender disparity in labour markets in Africa are dominated by sharp contrasts and have remained a serious challenge in many countries (ILO, 2019a). The International Labour Organization, among others, argues that most African men still earn more than their female counterparts even though the number of women in paid employment and non-agricultural sectors has increased by more than 3.5% over the past decade (ILO, 2019b). Moreover, it has been observed that the gender pay gap is 30% in Africa, compared to 24% globally, including both the formal and informal sectors. In sub-Saharan Africa, women opt to work in the informal sector mainly to have more time for their care responsibilities, and more than 89% of women work in

the informal economy (United Nations, 2023). This makes the labour market in Africa, just like other economic and social institutions, a source of gender imbalances, but could also be a solution for it if good policies are put in place.

In Nigeria, the constitution discourages any form of gender disparity in the workplace regardless of gender, ethnicity, political affiliation, religion and region, among other characteristics. However, there are concerns that the Nigerian labour market exhibits significant gender wage disparities (for example, Temesgen, 2008; Ajefu, 2019) and not much is known about how this inequality is distributed across the wage strata. Thus, the question of whether the glass ceiling or sticky floor is more relevant in explaining observed gender wage gaps in Nigeria has received limited attention among researchers. “Glass ceiling” is a labour market condition where females are pushed down to the lower cadre of an organization, and it seems difficult for them to attain the highest position in an organization. The “sticky floor” concept emphasizes the challenges women encounter at the lower levels of the job hierarchy, making it difficult for them to progress and earn higher wages.

Reports from The World Bank (2014) and the National Bureau of Statistics (NBS, 2019) have shown that opportunities for women to participate in paid jobs have continued to increase in Nigeria. NBS (2019) data also show that certain professions like teaching and health have a higher proportion of women (68% and 69%, respectively) compared to men. Conversely, traditionally risky occupations such as the military and plant machine operators are predominantly held by men (over 90% male-dominated). There are also some professions where the gender split is relatively equal, such as desk-bound jobs and hospitality and craft work, where men and women have roughly equal representation. In addition, improvements in women’s human capital endowments (i.e., higher education attainment) have been registered over the past two decades. Thus, Nigerian women’s participation in economic activities and human capital endowments have continued to show new dynamics. Yet, little is known about how these developments have shaped wage differentials between men and women in Nigeria.

The existing literature on labour market disparities in Nigeria has extensively examined gender wage gaps, often using mean decompositions as the primary analytical approach (e.g., Okpara, 2004; Oyelere, 2007; Nweke, 2014; Oginni et al., 2014). Some studies have also explored broader macroeconomic factors influencing labour markets, such as gender disparities in education and income, and have assessed gender pay gaps and workplace variations by considering data from both private firms and government institutions in Nigeria (e.g., Agu and Evoh, 2011; Aderemi and Alley, 2019). These investigations have consistently revealed the existence of gender gaps in the Nigerian labour market. For example, in a study conducted by Oyelere in 2007, it was found that in the period after the transition to democracy, men tended to have higher average incomes compared to women. This difference in income was most noticeable among individuals with lower levels of education. In simpler terms, men earned more than women, especially those with less education,

during the post-democracy period. While previous studies are informative about the gender wage gap in Nigeria, there is limited knowledge of the nature of the gender wage gap at various points of the earnings distribution, the factors underpinning it and how these have evolved over time.

To close these gaps, our paper contributes to the existing literature in three ways. First, previous studies on the gender wage gap in Nigeria concentrated on measuring and decomposing the gender wage gap at the mean. This provides an incomplete picture of the nature of wage disparities across the earnings distribution. Therefore, this study departs from analysis at the mean by considering the entire wage distribution using the approach by Firpo et al. (2009). Indeed, evidence from other countries shows that the gender wage gap may vary along the wage distribution. For example, Chi and Li (2008) found a wider gender gap in favour of men at the bottom of the distribution (“sticky floor” effect) in China. Conversely, Albrecht et al. (2003) and Arulampalam et al. (2007) found a strong “glass ceiling” effect in Sweden and Europe, respectively. This means that at the upper end of the wage distribution, male workers have higher earnings relative to their female counterparts. Knowledge provided by this research should prove highly valuable for Nigeria in informing labour market policies and institutions aimed at fostering gender equality and reducing gender wage disparity. Our findings can be utilized by government agencies tasked with formulating labour and employment policies to develop targeted measures that effectively tackle wage disparities across various income brackets. Moreover, labour unions and advocacy groups can utilize this data to advance their efforts in promoting equitable remuneration and equal prospects for women within the labour market. Through a comprehensive understanding of the intricate dynamics surrounding the gender wage gap and the specific demographics that bear the brunt of its impact, policy makers and institutions can collaboratively endeavour to establish a labour market that fosters inclusivity and fairness within the Nigerian context. Second, to the best of our knowledge this is the first study in Nigeria that provides a temporal analysis of the gender wage gap. To this end, we utilize the 2003/2004 and 2018/2019 Nigeria living standards surveys. Third, this paper sheds light on the factors underpinning observed gender wage gaps by decomposing the gender wage gap into “price” and “composition effects”. The composition effect, also called the endowment effect, shows how labour market characteristics of individuals influence the gender wage gap (Oaxaca, 1973). The price or wage structure effect explains how pricing or utilization of individual characteristics affects the gender wage gap (Blinder, 1973). We further investigate how the gender wage gap has changed over time and if this change can be attributed to changes in the underpinning factors. Accordingly, this study seeks to answer the following research questions:

- Are there significant gender differences along the wage distribution (i.e., is there any evidence of glass ceilings or sticky floors) in the Nigerian labour market?
- How do individual characteristics explain the gender wage gap at various points of the wage distribution?

- How has the gender wage gap and factors underpinning it changed over time in the Nigerian labour market?

The corresponding research objectives of the study are to:

- ascertain if there are significant gender differences along the wage distribution in the Nigerian labour market;
- examine how individual characteristics explain the gender wage gap in various parts of the distribution; and
- determine how the gender wage gap and factors explaining it have changed over time in the Nigerian labour market.

1.1 Background: Nigerian Labour Market

The labour market in Nigeria consists of the formal and large informal sectors. Available statistics from the NBS (National Bureau of Statistics, 2019) show that the informal market is made up of about 65% of Nigeria's workforce and dominates most of the activities in the economy even though it is characterized by low wages. The Nigerian labour market is also characterized by a high rate of unemployment, which has been exacerbated in recent years by high population growth, poor infrastructural development and poor economic growth performance. According to the NBS (2019), Nigeria's rate of unemployment rose to 22.6% in 2018 from 10.6 % in 2012. Furthermore, an NBS (2021) report shows that considering the number of fully employed and underemployed in the labour force, females accounted for 40% and 45.9% respectively, in 2020. Furthermore, Nigerian labour force statistics as at 2019 show that out of the labour force population of 62,447,230, women make up a total of 45.57% (i.e., 28,457,207), while 54.43% are men. An analysis of the trend of the female labour force in the last ten years shows that it has not experienced any significant growth, while the total labour force of Nigeria has seen a growth rate of 28% in the same period (NBS, 2021).

In terms of human capital development, the percentage of the male working-age population with intermediary education is 71.86%, while that of the male population overall is 66.18% (ILO, 2019a). Intermediate education comprises upper secondary or post-secondary non-tertiary education. Conversely, for the labour force with advanced education, the percentage for the male working-age population is 74.76%, while it is 73.68% for the female population (ILO, 2019b). Advanced education comprises short-cycle tertiary education, a bachelor's degree, a master's degree, a doctoral degree or the equivalent education levels (NBS, 2021). From the above statistics, one may argue that the gender differences across various levels of education may have contributed to the female unemployment rate being higher at 31.6% than that of the male unemployment rate at 22.9% in quarter 2 of 2020. This supports the argument of Bergmann (1974) who asserted that the gender wage gap can be explained through human capital factors, work patterns, past education, experience, and the labour

market structure. However, the study also argues that returns to education can be seen mainly through labour force participation.

Furthermore, despite the global awareness to promote gender equality in all human spheres, there is still a wide gap between the level of men's and women's participation in politics, trade unionism and decision making in both private and public organizations in Nigeria. To a large extent, most of the political institutions and pressure groups in Nigeria are exclusively dominated by men who determine the trends, goals and rules. This glaring imbalance of men's domination over women has attracted comments from scholars and researchers, especially women who seem to have been marginalized within the political arena. With the increasing recognition of women's seeming historic exclusion from the structures of power among the international community, domestic and global commitments are now being made to redress the gender imbalance in politics. Women's enhanced participation in governance structures is viewed as the key to redress gender inequalities in society (Imhonopi and Urim, 2011; Adetunmbi et al., 2022).

Over the years, labour market policies in Nigeria have also been centred around how to address the problem of minimum wage policies. Salaries and wages have been featured in government policies to improve the welfare of workers. Based on these objectives, the determination of sectoral wages and salaries in the public sector has been the responsibility of the Salaries and Wages Commission and administrative arms of the government. Whereas in the private sector, wages to a great extent are determined by the forces of demand and supply and, to a minimal extent, also influenced by wage levels in the establishments and parastatals of government (Fapohunda, 1979; Aminu, 2010 and Yusuf et al., 2018). Concerning wage determination some scholars, such as Aminu (2011) and Oginni et al. (2014), have argued that productivity changes play a lesser role than changes in the cost of living for the urban sector.

Furthermore, constant agitations for higher pay due to rising inflation and falling standards of living, as well as a phenomenal rise in the number of the working poor in Nigeria, have led the federal government to review the minimum wage upwards about eight times since 1974. These are the 1974 minimum wage adjustment to N60 per month, the 1981 minimum wage of N125, which was reviewed upwards to N250, and N363 in 1991 and 1993, respectively. Starting in 1998, the minimum wage adjustment was different for federal and state workers. The minimum was raised to N3,500 for federal workers and N3,000 for state workers in 1998, and again to N7,500 and N5,500, respectively, for federal and state workers in 2000. By 2011 and 2019, the minimum wage was raised to N18,000 and N30,000, respectively. While almost all states complied with the N18,000 minimum, some did not agree to pay N30,000 (NBS, 2019). However, the overall impact of these minimum wage adjustments on gender wage gaps is still a subject of debate because of inflationary pressures and other macroeconomic shocks in the system.

Other labour market policies that were directed at gender parity in Nigeria include the Gender Equality Duty Act 2007, which was designed to be implemented by all government ministries, agencies and departments. Moreover, the Federal Government

of Nigeria created the Ministry for Women Affairs and Social Development to address the special needs of women. With the support of the United Nations Development Programme (UNDP), the government also crafted a developmental policy roadmap entitled “Growth and Equality” and an Equality Act 2010 (UNDP, 2010). Perhaps these were all designed to reduce the perceived gender differences in the labour market. Several key indicators were tracked over the years to assess the impact of these developments on the labour market. The working-age population has consistently grown, reaching around 46.5% in 2013, and slightly declined to 43.9% in 2019 (ILO, 2022). However, female labour force participation rates have shown fluctuations, ranging from approximately 46.5% in 2013 to 43.9% in 2019 (ILO, 2022), highlighting the variability in women’s participation in the workforce. Figure 1A in appendix also Labour force participation rates between 2004 and 2018. Employment rates by sector suggest progress in women’s diversification into formal sectors like education, healthcare and services, indicating improvements in gender equality in specific industries. However, unemployment rates have remained a persistent challenge for both genders, with fluctuations observed over the years. Female unemployment rates ranged from 3.38% in 2013 to 12.48% in 2019, while male rates varied from 3.62% in 2015 to 9.25% in 2019 (ILO, 2022). Significant adjustments to the minimum wage policy were made during this period. In 1998, the minimum wage was raised to N7,500 for federal workers and N7,000 for state workers. By 2011 and 2019, further increments raised the minimum wage to N18,000 and N30,000, respectively. However, compliance with the N30,000 minimum wage was not universal among states, potentially influencing gender wage disparities across different regions (NBS, 2019). Understanding these developments jointly allows for a comprehensive assessment of their impact on the gender wage gap and the distribution of wages in Nigeria’s labour market. These systematic and gender-disaggregated accounts of Nigeria’s labour market developments reveal progress in some areas, such as improvements in working-age population and female labour force participation. Nevertheless, some challenges, including unemployment rates and variations in minimum wage compliance, underscore the need for continued efforts to achieve gender parity in the labour market.

However, these developments in the labour market over the past two or more decades may have affected the gender wage gap or its distribution. Christofides et al. (2010) argued that the “glass ceiling” is a key feature of gender wage differentials in many developing countries, but this remains a subject for empirical verification in the case of Nigeria.

2. Literature Review

2.1 Theoretical Literature

The neoclassical theory of distribution presents a fundamental argument for the earning and productivity of each factor of production (Solow, 1956; Swan, 1956). According to the theory, the forces of demand and supply are the main determinants of the earning of each factor in a perfectly competitive market. Conversely, it is the marginal productivity of a given factor of production that determines its demand. Thus, for a typical factor, output prices and wages are determined by the competitive forces of demand and supply. Thus, at equilibrium, the value of the marginal productivity of labour equals the wage earned by the labour (Mankiw, 2013). To maximize profit, a firm can, therefore, hire labour if it does not exceed the necessary conditions for the maximization of output. Therefore, the value of the marginal product of labour is also the firm's short-run demand curve for labour and it slopes negatively because of the diminishing marginal product of labour.

The human capital and the compensating wage differentials models are also part of the theoretical frameworks that are employed to elucidate the factors contributing to wage disparities within the labour market. The human capital model, which was formulated by economists such as Schultz (1961) and Becker (1965), proposes that individuals make investments in education, training and the enhancement of their skills in order to augment their productivity and potential for earning. Consequently, inequalities in wages among individuals can be ascribed to disparities in their investment in human capital. The theoretical framework places significant emphasis on the influence of education, experience and skills on the variations in wages.

In a similar vein, the compensating wage differentials model posits that disparities in wages stem from the propensity of workers to embrace specific job attributes or hazards in return for increased remuneration. Employees might opt for employment opportunities that come with unfavourable working conditions if they receive commensurately higher remuneration. Conversely, occupations that provide improved working conditions or reduced levels of risk may be associated with comparatively lower levels of remuneration. The compensating wage differentials model has particular relevance in the analysis of gender wage gaps, as it offers insights into the influence of occupational choices and job preferences on disparities in earnings (Rosen, 1986; Lancaster, 1966).

Becker's (1957 and 1965) labour market economics framework also offers significant contributions to the understanding of the gender wage gap, positing that women's lower earnings can be attributed to societal attitudes and gender-specific preferences that prevail in the labour market. Central to this model is the "taste-based segregation law" formulated by Becker in 1957. This law suggests that individuals, households, or enterprises may possess discriminatory preferences that impact their decision making within the labour market. The presence of discriminatory preferences has the potential to result in unequal treatment based on gender, thereby contributing to the existence of wage gaps between males and females. These preferences can be observed in the form of a willingness to pay an additional amount for specific attributes (such as male employees in particular positions) or a tendency to favour gender-segregated roles within the labour market. Nevertheless, it is crucial to acknowledge that this particular theory has faced criticism. Research conducted by Elliehausen and Durkin (1989) has suggested that the presence of deliberate discriminatory preferences should not be observed in a market that operates under perfect competition.

In addition to Becker's hypothesis of taste-based segregation, many factors contribute to gender wage discrepancies. Gender, preferences, and labour market advancement can also cause wage differences. Statistical discrimination and occupational segregation might affect the gender wage gap. When employers use stereotypes or demographic data to make hiring and wage decisions, it is called statistical discrimination. Employers' notion that women may be less devoted to their careers due to family obligations is an example of workplace bias. This view may decrease remuneration or employment opportunities (Arrow, 1973). Occupational stereotypes can also keep women out of male-dominated fields, prolonging gender-based income disparities. Occupational segregation refers to the phenomenon where people of different genders frequently exhibit disproportionate representation in particular industries or occupations, frequently as a result of societal expectations and prevailing gender norms. Throughout history, certain industries and occupations have been associated with particular genders, resulting in gender-based labour segregation. This is seen in the disproportionate number of women in education, healthcare and administrative fields. Unlike male-dominated areas like engineering or finance, these fields are often underestimated and have lower pay (Blau and Kahn, 1997). The gender wage gap may also be affected by a nation's labour market development. In modern and forward-thinking labour markets, equitable wages, and anti-discrimination and work-life balance policies are prioritized. Thus, gender wage inequalities are reduced. By contrast, less developed labour markets may lack extensive regulatory frameworks to reduce gender-based wage disparities, resulting in bigger wage gaps between men and women.

2.2 Empirical Literature

There is an abundance of studies that investigated gender wage gaps across different economies using different methods and approaches (Kyoore and Sulemana, 2019; Aderemi and Alley, 2019, among others). On the gender wage gap in both government

and corporate employment, Tubaro et al. (2022) and an earlier study by Van der Gaag et al. (1989), posit that developing country studies on public and private-sector wage differential point out two general types of outcomes. One aspect of the studies compares average wages (either on an aggregate level or stratified by levels of qualification) between these two groups of employees. The other aspect evaluates differences in income on the job description or individual attributes, such as learning and experience. This second strand is well rooted in the human capital approach. Apart from these two general types of outcomes, suggested above, some other works find that government employees enjoy significant wage segregation when compared to their private sector counterparts. They also show that male government workers earn higher wages than female workers in corporate enterprises, except those in the tertiary level where both genders earn a similar wage, holding other factors constant (Bedi, 1998; Tansel, 2004). Conversely, studies such as Mohan (1986) and Al-Samarrai, and Reilly (2005) argue that wage structures between the private and public sectors in Columbia and Tanzania do not have any major gender gap.

Exploiting the advances in methodology, some studies have analysed the extent and determinants of gender wage gaps at different points in the wage distribution. Prominent among the studies are Ahmed and Maitra (2011), Xiu and Gunderson (2014), Firpo et al. (2018) and Landmesser (2019). For example, Ahmed and Maitra (2011) used distributional analysis to decompose the wage difference among males and females into an endowment effect and a discrimination effect along the entire wage distribution. Using data from Bangladesh, the analysis found that men earned more than women at all points of the wage distribution and that the wage gap is higher at the lower end of the distribution. In another study, Xiu, and Gunderson (2014) used the recentred influence function (RIF) modification of quantile regressions to explore the determinants of and changes in the gender wage gap in China. The empirical results show that at the lower end of the wage system, there are large wage variations, while the higher end of the pyramid had weaker evidence of large wage gaps. This finding supports some weaker and limited evidence of a glass ceiling and stronger evidence of a sticky floor.

Using a quantile decomposition technique, Gallego-Granados and Johannes's (2015) analysis of the gender wage gap in Germany found that the unexplained net wage gap is about 5.2% lower for women living in couple households than for women living in single households, whether with children or not. In another seminal paper, Firpo et al. (2018) extended the Oaxaca-Blinder decomposition method that can be applied to various distributional measures by dividing the distributional changes into a wage structure effect and a composition effect using RIF regressions. The paper argues that the gaps experienced in U.S. male wages between the late 1980s and the mid-2010s were affected by factors such as education, de-unionization, occupation and industry changes.

There are many other empirical studies on gender wage gaps and income differentials for the U.S. and Canadian economy Canada (see, for example, Cook et al, 2021; Kassenböhmer and Sinning, 2010). Generally, these studies found that gender wage gaps are influenced by variations in learning and experience, among other factors.

In analysing gender disparity and wage gaps in labour markets in Africa, studies such as those by Kabubo-Mariara (2003), Kolev and Suarez (2010), Ntuli (2009), Bhorat and Goga (2013), Agesa et al. (2013) and Kwenda and Ntuli (2020) found evidence of significant wage gaps across different points of the wage distribution in the countries they studied. For example, Ntuli (2009) and Bhorat and Goga (2013) found evidence of a sticky floor effect in the South African labour market, and Agesa et al. (2013) found evidence of a glass ceiling in the Kenyan labour market where gender differences in characteristics widen the gender wage gap at the upper end of the wage distribution. Kabubo-Mariara (2003) investigated the existence of the gender gap in different sectors in Kenya and found that men are given preference in some sectors of the economy over their female counterparts. In a study by Kolev and Suarez (2010) in Ethiopia, women's wages were found to be only 55% of men's wages in 2005. This wage gap was a result of the characteristics of the job market, which was systematically found to be less favourable for women. A review by Ntuli and Kwenda (2020) of empirical studies on gender disparities in the labour market found significant gaps in employment and wages in favour of men across many countries in sub-Saharan Africa.

A few studies investigate gender wage gaps in Nigeria. The results from these studies (i.e., Fapohunda, 2013; Akekere and Yousuo, 2013; Okpara, 2004; Nweke 2014; Aderemi and Alley 2019) are mixed. Fapohunda (2013) applied descriptive statistics to assess gender wage gaps among employees in service industries and found that variations in individual attitudes explain the gender differences in earnings. Furthermore, Akekere and Yousuo (2014) used data from the National Salaries, Incomes and Wage Commission (NSIWC) to analyze the level of wage gaps and earning differentials among civil servants in federal and state government ministries, and in parastatals. Using a sample of 840 employees, the study found that in low-level jobs, gender wage gaps are more pronounced in favour of men, while females are more favoured in mid-level jobs. Okpara (2004) analysed primary data collected from 340 bank managers to investigate if a gender wage gap exists among managers and the impact of such wage gaps on the job satisfaction of male and female bank managers in Nigeria. The results show that there were significant gaps in salaries of the male and female bank managers that were sampled. Oyelere (2007) analysed gender wage gaps during the post-democracy era in Nigeria. The results revealed higher wages for men, on average, during the post-democracy era in Nigeria and that the wage gaps are more pronounced at lower levels of education. However, at the tertiary level, men and women have similar wages. In another study, Nweke (2014) investigated the existence of gender wage gaps using the Nigerian 2010 and 2012/13 general household surveys. The result of a mean wage decomposition showed gender wage gaps in favour of men. Some factors underpinning the wage gap were found in differences in individual characteristics (such as access to education and finance, among other things), and employment characteristics (such as differences within industries and occupations, among other things). The empirical results also show that the gaps were smaller in rural areas than in urban areas.

In a more recent study, Aderemi and Alley (2019) evaluated gender wage gaps in Nigeria's public and private sectors using the Blinder–Oaxaca and quantile decomposition methods. The results showed a large gender gap (in favour of men) in the private compared to the public sector. This is largely attributed to a higher income stream and better educational qualifications, occasioned by longer participation in the workforce. Notably, our study differs from Aderemi and Alley's study as we conducted a more in-depth analysis of the determinants of the gender wage gap at various points in the wage distribution. We also investigated how changes in individual characteristics influenced the observed gender wage gap in Nigeria. Therefore, while Aderemi and Alley (2019) used data at one point in time to conduct a static analysis, the current study conducts a dynamic analysis using different waves of household surveys.

2.3 Summary and Value Addition

The in-depth review of existing literature pertaining to gender wage disparities uncovered a wide range of studies with inconsistent findings. Although previous studies have provided valuable insights, substantial knowledge gaps remain regarding the nature of gender wage disparities within the Nigerian context. The primary focus of early research conducted in Nigeria centred on the average disparity in wages, a measure that may not comprehensively encompass the intricacies inherent in this subject. Recent studies conducted in other countries have underscored the significance of taking into account the entire range of wage distribution in order to identify variations in the gender wage gap.

In light of these findings, our study contributes to the existing literature in three ways. First, most early studies of the gender wage gap in Nigeria concentrated on the mean wage gap. However, focussing on the mean might not reveal the complete picture. Some studies from both developing and developed countries have argued that the wage gap varies over the entire wage distribution (Chi and Li, 2008; Albrecht et al., 2003; Arulampalam et al., 2007). Extending the analysis from the mean to the entire wage distribution is essential for policy consideration in Nigeria. Based on our estimation, we found that for the 2003/2004 period, contrary to some of the studies (Landmesser, 2019, among others), the wage gap showed an inverted U-shape. That is, the wage gap was bigger in the middle of the distribution than at the bottom or the top, which is evidence against sticky floors or glass ceilings in Nigeria. However, as time passed, the dynamics of wage inequality changed so that the gaps were bigger at the bottom than at the upper wage income levels in 2018/2019. In other words, more recently, a “sticky floor” has appeared in the distribution of the gender wage gap in Nigeria. Second, to the best of our knowledge this is the first study in Nigeria that examines the factors underpinning observed gender wage gaps along the entire wage distribution. To this end, we decompose the gender wage differential by applying an extension of the Oaxaca-Blinder decomposition that relies on RIF regressions. Third, this study provides a temporal analysis of the gender wage gap in Nigeria.

3. Methodology and Data

3.1 Theoretical Framework and Model Specifications

The theory used by researchers for decades to explain wage determination is the Mincer (1974) model. In this framework, wage is expressed as a function of education and experience. However, researchers have extended the model to account for other covariates that are related to individual demographic characteristics, productivity and location (Bils and Klenow, 2000). Wage determination and the gender wage gap are interesting empirical issues as new and richer data sets emerge, especially in developing countries. It is important to emphasize that labour markets differ across countries in aspects such as major sectors for wage employment, informality of labour markets and labour laws. Considering the Nigerian context, we specify the following log wage equation:

$$\ln wage_i = \beta_0 + \beta_1 educlevel_i + \beta_2 experience_i + \phi Z + \mu_i \quad 1.1$$

where $\ln wage$ is the log wage of person i , $educlevel$ is the level of education completed, $experience$ is work experience, Z is a vector of other covariates Φ is a vector of parameters, and μ_i is the error term. Equation 1.1 is estimated for two groups (g =male, and female) so that the contribution of each covariate to differences in the wage distribution of males and females can be divided into composition and wage structure effects.

In order to decompose the gender wage gap at all (quantile) points along the wage distribution between males and females based on Equation (1.1), we follow the approach proposed by Firpo et al. (2018) and apply unconditional quantiles in the decomposition of gender wage gaps in the Nigeria labour market.

Following from Firpo, Fortin and Lemieux (FFL, 2018), the τ -th quantile of the distribution F is defined as the function of the form:

$Q(F, \tau) = \inf\{y | F(y) \geq \tau\}$ or q_τ . and its influence function can be written as

$$F(y; q_\tau, F) = \frac{\tau - \mathbb{I}\{y \leq q_\tau\}}{f_y(q_\tau)} \quad 1.2$$

As demonstrated by FFL (2018; 2009), the RIF of the th quantile is given by:

$$RIF(y; q_\tau, F) = q_\tau + F(y, q_\tau, F) = c_{1,\tau} \cdot \mathbb{I}\{y > q_\tau\} + c_{2,\tau} \tag{1.3}$$

where $c_{1,\tau} = 1/F_Y(q_\tau)$, $c_{2,\tau} = q_\tau - c_{1,\tau}(1 - \tau)$ and $f_Y(q_\tau)$ is the density of Y evaluated at q_τ .

In this way,

$$E[RIF(Y; q_\tau, F) | X = x] = c_{1,\tau} \cdot \Pr[Y > q_\tau | X = x] + c_{2,\tau}.$$

The way to estimate the conditional mean of the RIF is similar to the estimation of the conditional probability model of being below or above the quantile of interest q_τ , with a rescale factor of $C_{1,\tau}$ in order to show the relative importance of the quantile to the wage distribution, rescaled by a constant factor $C_{2,\tau}$.

The decomposition of (unconditional) quantiles follows the same approach as mean decomposition. In stage one, the estimation of $q_{\tau g}$, $g = 1, 0$ (male, female) and \hat{q}_τ

$$\begin{aligned} \hat{q}_{\tau g} &= \arg \min_q \sum_{i=1}^N \hat{\omega}_g(T_i) \cdot p_\tau(Y_i - q) \quad g = m, w \text{ and} \\ \hat{q}_{\tau g} &= \arg \min_q \sum_{i=1}^N \hat{\omega}_C(T_i, X_i) \cdot p_\tau(Y_i - q) \dots \dots \dots \end{aligned} \tag{1.4}$$

are obtained by reweighting as:

Software packages such as Stata can easily compute $\hat{q}_{\tau g}$ and $q_{\tau C}$ with an appropriate reweighting factor. Hence, the gaps can be calculated as:

$$\hat{\Delta}_0^{q_\tau} = \hat{q}_{r1} - \hat{q}_{r0}; \quad \hat{\Delta}_S^{q_\tau} = \hat{q}_{r1} - \hat{q}_{c} \quad \text{and} \quad \hat{\Delta}_X^{q_\tau} = \hat{q}_{c} - \hat{q}_{r0} \tag{1.5}$$

In stage two, the linear RIF regressions is estimated; this can be done for each observation by inserting the sample estimate of the quantile \hat{q}_τ , and using it to estimate the density of the quantile $f(\hat{q}_\tau)$. For example, if $Y_i | T = 1$, the RIF regressions can be estimated by substituting the usual dependent variable, Y , with the estimated value of $RIF(y; q_{\tau 1}, F)$, which can also be done with standard software packages such as Stata. The estimated coefficients will therefore be:

$$\hat{\gamma}_g^{q_\tau} = \left(\sum_{i=1}^N \hat{\omega}_g(T_i) X_i X_i' \right)^{-1} \cdot \sum_{i=1}^N \hat{\omega}_g(T_i) X_i \hat{RIF}(Y_i; q_{\tau g}, F_g), \quad g = 0, 1. \tag{1.6}$$

$$\hat{\gamma}_C^{q_\tau} = \left(\sum_{i=1}^N \hat{\omega}_C(T_i, X_i) X_i X_i' \right)^{-1} \cdot \sum_{i=1}^N \hat{\omega}_C(T_i, X_i) X_i \hat{RIF}(Y_i; q_{\tau C}, F_C). \tag{1.7}$$

This can be decomposed in the case of the mean gap as follows:

$$\hat{\Delta}_S^{q_\tau} = E[X, T = 1]'(\hat{\gamma}_1^{q_\tau} - \hat{\gamma}_C^{q_\tau}), \quad 1.8$$

$$\hat{\Delta}_X^{q_\tau} = (E[X | T = 1] - E[X | T = 0])'\hat{\gamma}_0^{q_\tau} + E[X | T = 1]'(\hat{\gamma}_C^{q_\tau} - \hat{\gamma}_C^{q_\tau}). \quad 1.9$$

This approach, which is a direct extension of the Oaxaca (1973) and Blinder (1973) (OB) decomposition technique, relies on the RIF regression in order to estimate the effects of covariates on the distribution of wages between males and females. One important advantage of this approach is that it allows the general distributional measures to be decomposed non-sequentially in the same way that mean gaps are decomposed using the OB approach (Firpo et al. 2009, 2011, 2018). Firpo et al. (2018) have demonstrated that the extension to the conventional OB technique is a two-stage procedure that can be applied to any distributional measure of the variable of interest and not only the mean gap. The first stage involves the decomposition of the distributional statistic of interest (in this case, quantile) into a wage structure component using a reweighting method that is either estimated parametrically or non-parametrically. Thus, the first step of the estimation procedure consists of estimating the weighting functions $\omega_1(T)$, $\omega_0(T)$ and $\omega_{1c}(T, X)$. Then, the distributional statistics ν_1 , ν_0 and ν_C are computed directly from the appropriately reweighted samples.

The second stage involves the division of the wage structure and decomposition components into the contribution of each of the explanatory variables. This can be achieved by applying the regression method proposed by Firpo et al. (2009, 2011, 2018) to estimate the effect of changes in the explanatory variables on any distributional statistic of interest. This method replaces the dependent variable of the specified model by the corresponding RIF for the distributional statistic of interest. For a detailed explanation of this approach, see Firpo et al. (2018). For identification purposes, the FFL approach shows that, when there are no group differences in the wage determination functions, we should find no wage structure effects. Also, if there are no group differences in the distribution of the covariates, there will be no composition effects.

In decomposing the gender wage gap between males and females in the Nigerian labour market, we employ a quantile distributional measure that has been extensively applied in the decomposition of wage distributions. They are found useful to infer entire distributions and counterfactual distributions, even when the object of interest are the unconditional quantiles (Firpo et al., 2018; Machado and Mata, 2005; Melly, 2005) and have been used, for example, to address the issues of glass ceilings and sticky floors in decompositions of the gender wage differential. We estimated the wage gap at the 10, 20...,90 quantiles to cover the entire distribution.

3.2 Sample Selection

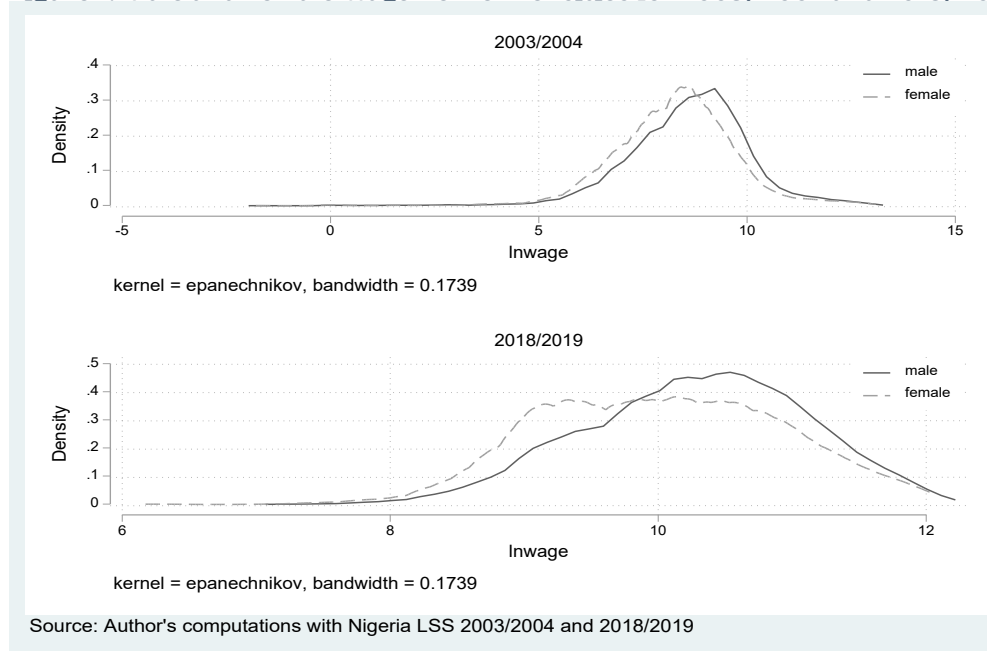
As stated in the background of this paper, Nigeria's labour market is characterized by high unemployment for both males and females. As a result, labour force participation is far higher compared with the number in wage employment, and as noted by Bhorat and Goga (2013) the subsample number of wage earners is not representative of the participation rate. Also, many empirical studies (see, for example, Bhorat and Sumayya, 2013) used sample correction, especially the methodology suggested by Heckman (1976), to correct for the bias due to selection in the labour force and employment. The Heckman approach models earnings as a function of the characteristics of wage earners conditional on the fact that these earners are a subsample of all the employed which is, in turn, a subsample of potential participants whose wages cannot be determined. However, as Bhorat and Goga (2013) point out in their study, this approach has shortcomings that may introduce some bias in the gender wage decomposition. These include: difficulty in identifying the exclusion restrictions appropriately; the measurement of the error problem; the presence of heteroscedasticity; and the identification and validity of the assumptions that underlie the distribution. We also tried to correct for selection bias, but our results were consistent with those of other studies (Bhorat and Goga, 2013, among others) that applied this approach and did not find the correction term statistically significant. In light of these limitations and data constraints this study found a strong justification to apply sample correction procedures. However, in order to control for the index number problem, we normalized the dummy variables in the estimations and interpreted the results directly.

4. The Data

We use the 2003/2004 and 2018/2019 Nigeria Living Standards Surveys (NLSs) for this study. In the 2003/2004 living standards survey, a total of 92,000 responses of individuals were captured; 68,500 of these individuals were in the labour market while 15,888 were in paid employment. The 2018/19 survey is the most recent survey in the country, with a total of 116,320 individuals; 49,780 of these individuals that were included were in paid employment. The sample for our analysis was restricted to individuals aged 15–65 years in paid employment with full information on key variables. This leaves a sample of 7,835 in 2003/2004 and 6,067 in 2018/2019. Notably, the sampling frame and information collected were the same across surveys, which allows for comparisons over time.

For the key variable, wages, respondents indicated the frequency of payment, i.e., daily, weekly, biweekly, monthly, quarterly or annually. To facilitate comparability, we converted all wages to reflect monthly income. This is consistent with the structure of the labour market Nigeria where, except for labourers who are remunerated on a daily or piecemeal basis, the majority are paid on a monthly basis. In order to facilitate the comparison of wages over time, and using 2009 as the base year, we deflated the nominal wages by the consumer price index to obtain real wages. Figure 1 plots the kernel densities of log earnings for the two surveys, while Figures 2A and 3A in the Appendix show nominal and real wages for different occupations. The density function for the two years are approximately normally distributed. However, the density function is left skewed in 2003/2004 compared to 2018/2019, suggesting that the mean is less than that of 2018/2019 (in nominal terms anyway). Also, the density of the function of female wages lies to the left of the function for males, suggesting that the mean of female wages is smaller relative to that of males.

Figure 1: Male and Female Wage Kernel Densities for 2003/2004 and 2018/2019



Source: Author's computations with Nigeria LSS 2003/2004 and 2018/2019

Additional variables that are used in the analysis are: occupation, education, age, marital status, unionization, geopolitical zone dummies and rural/urban location. The data set has no specific information on experience and tenure.

Table 1 shows the descriptive statistics (mean and standard deviation) of the key variables by gender for 2003/2004 and 2018/19. We find that average wages are higher for males compared to females in the two periods. For example, in 2003/2004 and 2018/2019, average wages for male workers were N13,775.50 and N42,822.30, respectively. The average wage for females over the two periods were NN11,249.51 and N33,453.70, respectively. The wage gap between them was N5,574.30 in 2003/2004, and by 2018/2019 the average wage gap in nominal terms had risen to N9368.60. Over the 15-year period, the average male wage increased by approximately 54.81%, while that of female workers went up by about 58.82.4%. The ratio of the male nominal wage income to that of female workers was 1.40 in 2003/2004, but dropped to 1.28 (or by 1.22 in real wages) in 2018/2019. This seems to suggest a reduction in the relative gender wage gap over the two periods.

Table 1: Descriptive statistics of variables by gender and period

Time=>	2003/2004				2018/2019			
Gender=>	Male		Female		Male		Female	
Variables	mean	sd	mean	sd	mean	sd	mean	sd
Wage (nominal)	19349.8	40325.6	13775.5	38316.6	42822.3	31293.4	33453.7	30890.3
lnwage	9.01	1.40	8.49	1.42	10.41	0.75	10.04	0.89
Realwage	30376.6	63305.5	21625.6	60151.6	15922.5	25816.9	13192.6	16059.0
lnrealwage	9.46	1.40	8.95	1.42	8.87	1.49	8.86	1.31
Demographics/location								
Age	41.3	11.77	39.3	11.76	38.9	11.85	37.5	11.07
Urban	0.31	0.46	0.34	0.47	0.46	0.50	0.56	0.50
Never married	0.16	0.36	0.08	0.27	0.26	0.44	0.23	0.42
Married	0.80	0.40	0.76	0.43	0.71	0.46	0.63	0.48
Divorced	0.01	0.09	0.01	0.11	0.01	0.08	0.02	0.14
Separated	0.02	0.14	0.04	0.19	0.01	0.12	0.04	0.20
Widowed	0.02	0.13	0.12	0.32	0.01	0.10	0.09	0.28
Union	0.15	0.35	0.09	0.28	0.37	0.48	0.39	0.49
Education								
None	0.09	0.29	0.10	0.31	0.07	0.26	0.03	0.17
Primary	0.36	0.48	0.40	0.49	0.13	0.34	0.10	0.29
Secondary	0.33	0.47	0.31	0.46	0.42	0.49	0.34	0.47
Above secondary	0.22	0.41	0.18	0.39	0.38	0.49	0.54	0.50
Occupation								
Professional_technical	0.11	0.31	0.09	0.28	0.25	0.43	0.56	0.50
Administration	0.02	0.14	0.01	0.11	0.15	0.35	0.11	0.32
Clerical services	0.16	0.37	0.14	0.34	0.15	0.35	0.13	0.33
Sales_related	0.09	0.29	0.29	0.45	0.04	0.20	0.05	0.21
Manufacturing	0.10	0.29	0.07	0.26	0.26	0.44	0.05	0.22
Agriculture	0.48	0.50	0.39	0.49	0.31	0.46	0.22	0.41
Others	0.04	0.19	0.01	0.08	0.03	0.17	0.01	0.12
Observations	5083		2752		4159		1906	

The average age for males and females were 41.3 and 39.3, respectively, for the period 2003/2004, while in the 2018/2019 period, they had gone down to 38.9 and 37.5, respectively. It appears that, recently, younger people have been entering the labour market. This may be attributed to the younger age at which individuals completed their education at different levels in recent years compared to earlier periods. Statistics also show that the percentage of urban wage earners increased from 31% and 34% in 2003/2004 for males and females, respectively, to 46% and 56% by 2018/2019. This suggests that there were more females than males working in the urban wage sector in Nigeria. Corresponding to this is, the percentage of married individuals in wage employment declined from 80% and 76% in 2003/2004 to 71% and 63% in 2018/2019 for males and females, respectively. This may be attributed to the younger age of the labour force over time. Union membership increased for both

men and women between 2003/2004 and 2018/2019. We also note that there is a high rate of unionization among women compared to men in 2018/2019. An increase in union membership also suggests an increase in the proportion of decent jobs where workers have a voice in the Nigerian labour market.

5. Results

Over the period studied, there was an increase in the secondary and above-secondary levels of education for both males and females. More specifically, while the average level of education above secondary increased marginally from 22% to 38% for male workers, the corresponding increase in the same level of education for the female labour force was from 18% to 54% (or a 36-percentage-point increase). Thus, the female labour force appears to have achieved more in the above-secondary level of education compared to males over the two periods. A look at occupations shows that there is an increase in the number of males and females in technical and professional jobs and administrative positions. The number of females joining professional and administrative jobs saw a significant increase over the past 15 years in Nigeria. Conversely, the percentage of males and females in clerical services declined by one percentage point. Furthermore, while there was a huge increase in the percentage of males in manufacturing and processing from 16% to 26%, there was a decline in the percentage of females in this occupation, even though it is a well-paying sector compared to agriculture. The proportion of males and females in agricultural employment declined from 48% and 39% to 31% and 22%, respectively, over the 2002/4 and 2018/19 periods. Although women are moving into better paid industries in recent years, their average pay remains lower in the same occupation compared to men (see Figures 1A and 2A in the Appendix).

6. Discussion

6.1 The Gender Wage Gap and Overall Decomposition

This section presents our estimates of the gender wage gap in Nigeria. In the decomposition, the male coefficients are used as the reference coefficients and the counterfactual shows what female wages would have been if had they similar characteristics than their male counterparts. However, as in some previous studies, since the counterfactual is similar to the male coefficients, we chose not to report them. Table 2 and Figure 2 present the aggregate results for the gender wage gap, which includes the mean and the decomposition results at all points on the wage distribution from the 10th to the 90th quantile, obtained from the Oaxaca-type RIF decompositions for the 2003/2004 and 2018/2019 surveys.

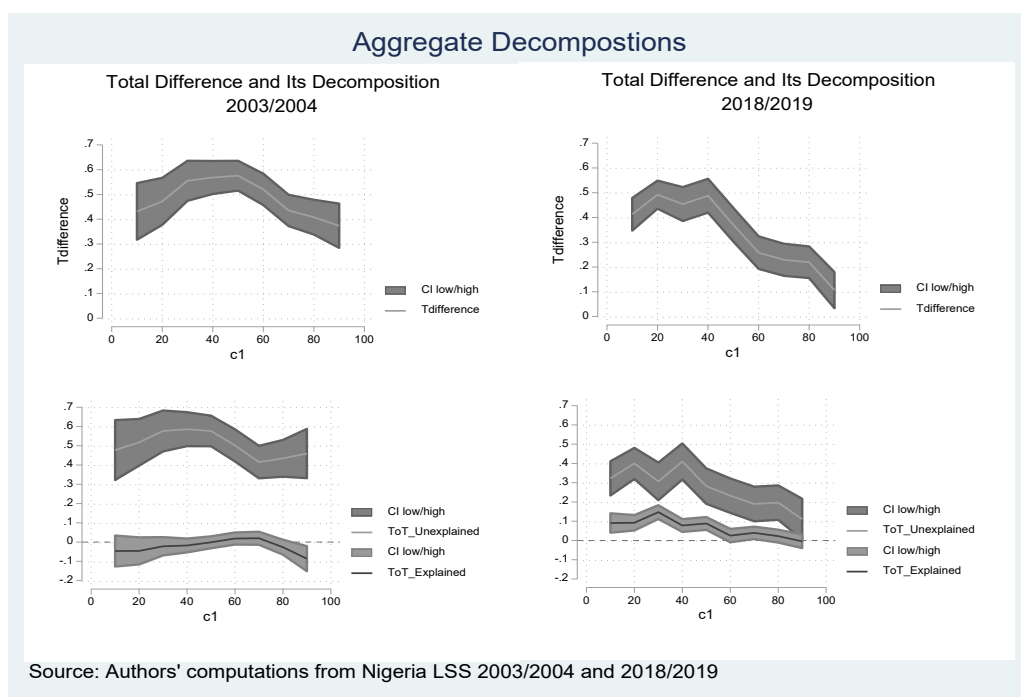


Figure 2: Total gender wage gap, composition and wage structure effects

Table 2: Decomposition results for total, composition and wage structure effects, 2003/2004 and 2018/2019 surveys

	2003/2004			2018/2019		
	Tdifference	ToT_Explained	ToT_Unexplained	Tdifference	ToT_Explained	ToT_Unexplained
Mean	0.482*** (0.000)	-0.0208 (0.299)	-4.10% "0.502***" (0.000)"	0.352*** (0.000)	0.0443*** (0.001)	0.308*** (0.000)
q10	0.431*** (0.000)	-0.0388 (0.351)	9.00% (0.000)	0.413*** (0.000)	0.0918*** (0.000)	0.321*** (0.000)
q20	0.472*** (0.000)	-0.0405 (0.261)	-8.7% (0.000)	0.492*** (0.000)	0.116*** (0.000)	0.376*** (0.000)
q30	0.555*** (0.000)	-0.0164 (0.504)	-2.9% (0.000)	0.454*** (0.000)	0.148*** (0.000)	0.306*** (0.000)
q40	0.568*** (0.000)	-0.0141 (0.447)	-3.6% (0.000)	0.488*** (0.000)	0.0784*** (0.000)	0.410*** (0.000)
q50	0.576*** (0.000)	0.00117 (0.942)	0.3% (0.000)	0.371*** (0.000)	0.0903*** (0.000)	0.280*** (0.000)
q60	0.520*** (0.000)	0.0212 (0.190)	4.0% (0.000)	0.258*** (0.000)	0.0264 (0.141)	0.232*** (0.000)
q70	0.435*** (0.000)	0.0218 (0.215)	5.1% (0.000)	0.229*** (0.000)	0.0407* (0.014)	0.188*** (0.000)
q80	0.408*** (0.000)	-0.0269 (0.182)	-6.6% (0.000)	0.219*** (0.000)	0.0236 (0.173)	0.196*** (0.000)
q90	0.374*** (0.000)	-0.0888** (0.009)	-23.5% (0.000)	0.107** (0.004)	-0.00410 (0.822)	0.111* (0.040)

p-values in parentheses
 ="+ p<0.10 * p<0.05 ** p<0.01 *** p<0.001" Source: Authors' computations using Nigerian survey data.

First, the overall results show that there is a significant gender wage gap in Nigeria, at the mean and at all points along the wage distribution for the two periods. Women consistently earn less than men in Nigeria. This is in line with the finding by Aderemi and Alley (2019) who show a wide variation in the wages of males and females in favour of male workers in private and public sectors in Nigeria. This evidence is also supported by studies in other African countries, such as South Africa (Ntuli, 2009; Bhorat and Goga, 2013), Kenya (Kabubo-Mariara, 2003; Agesa et al., 2013; among others). Second, the pattern of the gender wage gap differs in the two periods. In 2003/2004, the gender wage gap was larger in the middle of the distribution (i.e., the 30th–60th quantiles) as well as at the mean, while it is smaller at the bottom and the top of the wage distribution. For example, at the 30th, 40th, 50th and 60th quantiles the mean gaps were 0.555, 0.568, 0.576 and 0.520, respectively. However, from the 70th to 90th quantiles the gap went down progressively from 0.435 to 0.374. Bhorat and Goga (2013) found similar patterns for gender wage gaps in post-Apartheid South Africa. The high negative value of the composition effects attenuated the gap at the 90th quantile, thereby causing it to decline. Thus, this inverted U-shape is evidence against the sticky floor and glass ceiling in the gender wage gap in Nigeria in 2003/2004. Third, since the 2003/2004 period there has been a change in the dynamic of the gender wage gap such that the gap is wider at the bottom, that is, between the 10th and 40th quantiles than at the top of the distribution, which started reflecting in the 2018/2019 data. At the lower end of the distribution the mean log wage gaps are 0.413, 0.492, 0.454 and 0.488, respectively, for the 10th, 20th, 30th and 40th quantiles. However, for the 60th, 70th, 80th and 90th quantiles the gaps were 0.258, 0.229, 0.219 and 0.107, respectively. This is strong evidence of a sticky floor in the gender wage gap in Nigeria. Chi and Li (2008) found similar effects for the gender wage gap in China. It means that women who earn low wages in the country earn less than men even if they have similar attributes, whereas those who earn more face a smaller wage disparity relative to males. Nevertheless, the gender wage gap still exists in Nigeria despite the gains females have made in wage-setting characteristics since 2005 such as higher education, more employment in unionized jobs and an increasing share of professional and administrative positions. However, these factors may have accounted for the decreasing gap at the top of the wage distributions as they are related to high-paying jobs. This is shown in Figure 2, where we report the total difference for the two periods as well as the composition and wage structure effects (that is, the explained and unexplained gaps).

In the 2003/2004 period, the wage structure effect was dominant, explaining between 94% and 123.5% of the total wage gap and was significant at every point in the wage distribution. The composition effect was only significant at the highest end of the wage distribution. Thus, returns to characteristics and not the characteristics themselves were the major driver of the gender wage gap in Nigeria in 2003/2004. This may be due to the norm that employers of labour in Nigeria, especially in the private sector, usually do not see women as efficient as their male counterparts even when they have similar characteristics. As a result, the trend was to price them lower,

possibly due to the high unemployment rate, which also works against women in the labour market. This may have been the reason why the issue of the gender wage gap started dominating wage policies and attracted the attention of various interest groups in Nigeria that led to the signing of the Gender Equality Duty Act 2007, and the crafting of the “Growth and Equality” and the Equality Act 2010. This legislation was meant to address issues related to discrimination against women in terms of how they are rewarded in similar jobs if they have similar attributes than the male counterparts. This may also explain the recent increase in the share of women in labour unions in the country.

Unfortunately, there is still evidence of the gender wage gap in Nigeria even though there is a general decline at almost all points along the distribution as shown by the results for the 2018/2019 period. The decomposition results for 2018/2019 show that the composition effect accounted for a significant share of the gender wage gap between the 10th and 50th quantiles, and even at the 70th quantile, with a share of between 16% and 32.8%. Conversely, the wage structure or the unexplained effect, though still dominant, accounts for between 62.2% and 103.7% of the gap. At the mean, 87.5% of the wage differential is attributed to returns to characteristics, while 12.5% is due to differences in the observed characteristics. The larger gap observed at the bottom of the wage distribution during this period compared to the 2003/2004 period partly and significantly accounted for the positive contributions of the observed characteristics to the gap. This presents emerging evidence that women’s attributes are lagging behind those of men, especially at the bottom end of the wage distribution and that this sticky floor is explained both by the composition and the wage structure effects. At the top of the distribution, women receive wages fairly similar to men. However, the general decline in the wage gap in recent periods can be attributed to some factors including government anti-discriminatory labour policies, agitation for equal pay and improvements in the endowment of women. In other words, more recently the pricing of wages for women as well as gains in their observed characteristics have been effective at the top of the wage distribution, therefore in well-paying jobs the gap between the two sexes is decreasing rapidly.

6.2 Detailed decomposition of gender wage gap

A decomposition of the gender wage gap produces different results based on the choice of categorical variables or the issue of identification of reference groups. To avoid this, following Yun and Lin (2015) we normalized categorical variables (i.e., education, occupation and zones) to produce decomposition effects that are expressed as deviation contrasts from the grand mean. Also, we tried computing potential experience as a function of age and years of schooling conditional on educational qualifications and using it as one of the covariates. But the computed experience and its square were statistically insignificant at all quantiles for both the composition and wage structure effect. This may be because it is too linear to capture

any of the characteristics of the Nigerian labour market characterized by both high levels of unemployment and the long duration of unemployment. Hence, we dropped it and continued using age, which also includes years of experience.

The detailed decomposition results that show the effects of individual covariates on the gender wage gap are reported in Figures 3 to 5 and Tables 1A and 2A in the Appendix. The findings show that demographic characteristics, human capital (education level), occupational factors and location explain the composition effect of the wage gap as well as the wage structure effect. As a general note and corroborating the findings by Firpo et al. (2018), no single factor appears to be able to fully explain the polarization of the wage distribution over time. The continuing growth in returns to education, especially at a level above secondary education, is the most important cause for the decline in the wage gap in Nigeria. Changes in the occupational structure of the workforce, especially more women joining top administrative and technical positions in both the public and private sectors in Nigeria, have not consistently and significantly explained the pattern of the wage gap in terms of both composition and wage structure effects.

6.2.1 Demographic Factors

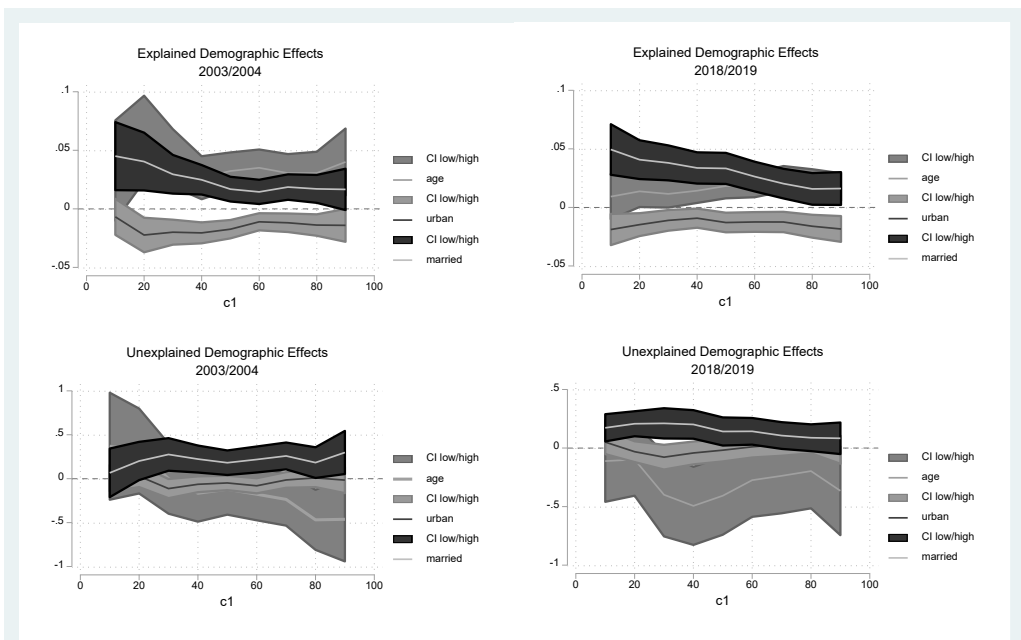
Age: For the 2003/2004 and 2018/2019 periods, while the endowment effects related to age contribute positively and significantly to gender wage at the mean and between the 20th and 90th quantile, the results also show that age serves to reduce the gender wage gap through the wage structure effect. For the 2018/2019 period, the effect of age on the wage structure effect (or the unexplained component) was statistically significant in the middle of the distribution. For the composition effect, the higher average age of male workers potentially includes more work experience, which may explain its effect of widening the gender wage gap. By contrast, the negative contributions of age through the unexplained (or wage structure) effect could be because with an increase in age, along with the experience embodied in it, the rate of pay for women is such that the gap becomes smaller. In terms of magnitude, the overall effect of age acts to reduce the gender wage gap, since the negative effect on the wage structure effect is stronger than its positive effect through the composition effect. This is more pronounced in the 2018/2019 period.

Urban Location: For the two periods, we found strong evidence that living in an urban area has a statistically significant reducing influence on the gender wage gap in Nigeria, mostly through the composition effect. The price effect of urban residence is negative at almost all points, except at the 10th and 90th quantiles. The net effect shows that urban residence reduces the wage gap except at the 10th, 70th and 80th quantile for 2018/2019 period, where net effects are positive. Thus, the effects of urban residence in reducing the gender wage gap are strongest in the middle of the distribution. This finding may be attributed to the fact that urban sector employment has become more competitive in the country in recent years and women who have the opportunity to secure such jobs receive pay that is closer to what their male counterparts earn.

It is also important to note that urban wages in Nigeria have increased in nominal terms since about 2000 when the financial services industries started attracting a more educated labour force, especially through offering competitive wages and also the upward review of entry-level qualifications to a bachelor’s degree in most establishments, whether private or public.

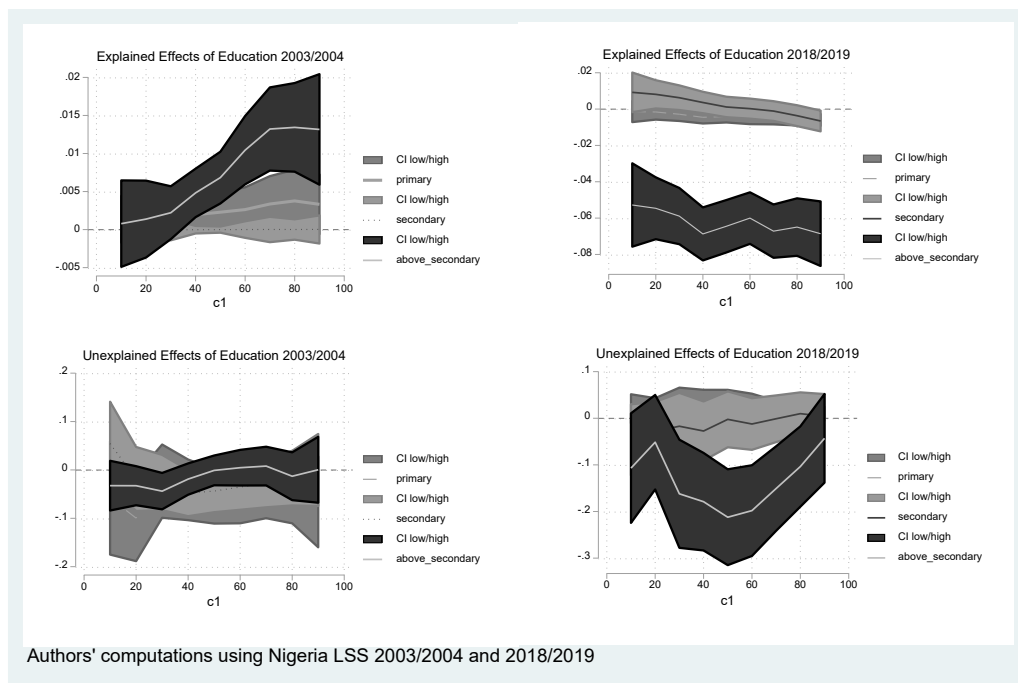
Marital Status: Marital status is one of the most important labour characteristics and has been found to have a significant influence on labour force participation rate, occupational choice and wages, especially in the private sector because it influences labour force productivity, especially that of women. Our findings, as reported in Tables 1A and 2A and Figure 3, consistently show across the two periods and for both composition and wage structure effects that being married widens the gender pay gap at all points of the wage distribution. This finding may be due to the belief that married women tend to have lower productivity and as a result they are not attractive to most employers for certain positions, which causes the pay gap to widen when those jobs are paying higher wages. Moreover, the way women are rewarded still widens the gaps because it is likely that employers would offer low pay for reasons such as high levels of absenteeism as a result of childbearing, except in the public sector where women enjoy longer maternity leave and marriage has little or no influence on employment in most establishments.

Figure 2: Explained and unexplained effects of demographic factors on gender wage gap



Authors' computations using Nigeria LSS 2003/2004 and 2018/2019

Figure 3: Explained and unexplained effects of levels of education on gender wage gap



6.2.2 Effects of Education/Human Capital

Education: The results reported in Table 1A and Figure 4 show that for the 2003/2004 period the endowment effect associated with education above the secondary level has an increasing effect on the gender wage gap at all points in the distribution, and the magnitude of this effect is bigger at the upper end of the wage distribution (i.e., 60th to 90th quantiles). Conversely, the wage structure effect associated with higher education acts to reduce the gender wage gap. Aggregating both effects, we found that for this period education above secondary level has a reducing influence in the middle and at the lower end of the wage distribution, while its influence at the higher end is to increase the gender wage gap, especially between the 70th and 90th quantiles. This may be due to the fair share of women in the above-secondary level of education during this period even though it favours women in terms of how they are rewarded in the labour market. In 2018/2019, both the composition and wage structure effect associated with higher education acted significantly to reduce the gender wage gap. This suggests that the increasing share of women with higher educational qualifications is paying off. That is, where women happen to have obtained higher educational qualifications such as university degrees, they have continued to have a fair share of well-paying jobs, which may have been the major cause of the reduction in the wage gap in the labour market in 2018/2019.

6.2.3 Effects of Occupational Factors

The effects of occupational factors such as union membership, public sector employment (the dominant employer in Nigeria), and types of occupation on the gender wage gaps are reported in Tables 1A and 2A as well as in Figure 5 for the two periods 2003/2004 and 2018/2019.

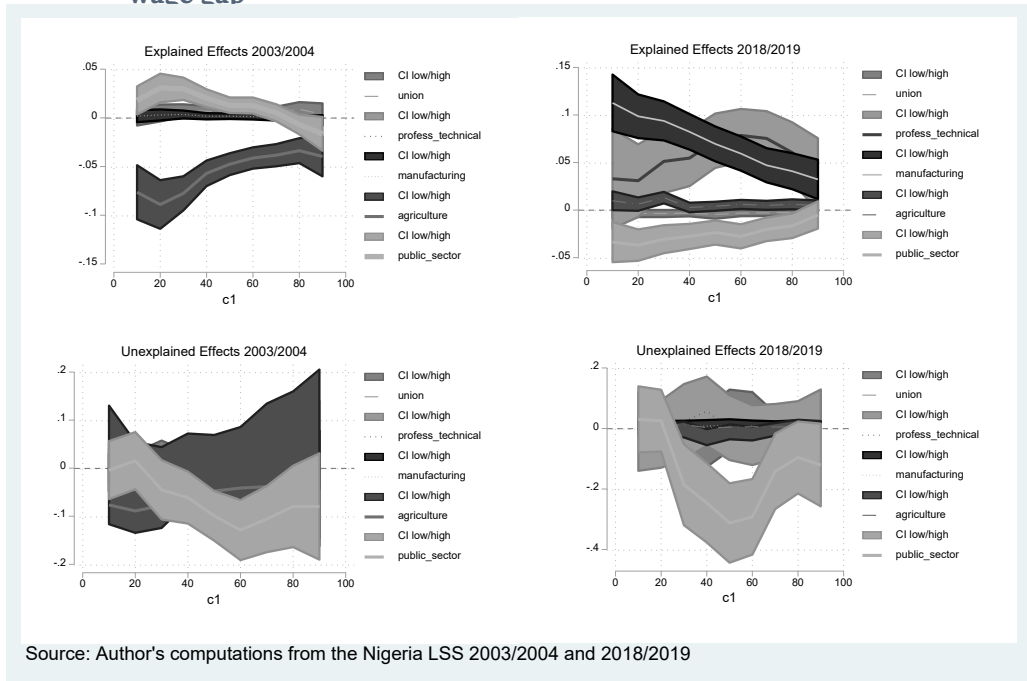
Unionization: The results for 2003/2004 show that the endowment effect related to union membership in the workplace increases the wage gap at almost all points in the wage distribution. The corresponding price effect is negative though not statistically significant at all points in the wage distribution, except at the 30th and 40th quantile where it is positive. While union membership increases the wage gap because men are more likely to participate, by contrast, it decreases the gender pay gap in the sense that women in union-related jobs get fairer pay compared to men. This may be attributed to the fact that before and over this period, women's unionization rates were lower compared to men and hence they were in jobs with limited protection. Over time unionization increased for both men and women. This may be the reason why in 2018/2019 there is a general union effect that reduces the gender wage gap through both the composition and price effects. These results are consistent with theory as unions are expected to negotiate better pay for its members, which consequently reduces the gender wage gap as there is no gender bias in union negotiations.

Public Sector Employment: For 2003/2004, we found that the composition or endowment effect of public sector employment acts to increase wage inequality at the bottom and in the lower middle of the wage distribution. But at the top of wage income, that is between the 70th and 90th quantile, the public sector composition effect increased the gender wage gap. This can be attributed to the underrepresentation of women in top positions in the civil service and across all services sectors at that period. However, the wage structure effect served to reduce the gender gap because men and women are not priced differently in Nigeria's public sector. The net effect of the public sector on the gender wage gap is that it increases the gap at the lower end of the distribution (i.e., 10th and 30th quantile) but decreases the gap between the 50th and 90th quantile. For 2018/2019, the net effect of price and composition effects is positive between the 10th and 30th quantile. However, both the wage composition and wage structure effect act to reduce the gender wage gap between the 40th and 70th quantile before it moderates between the 80th and 90th quantile. This pattern of effect helps to explain sticky floor evidence found in the wage gaps during this period. Overall, we have strong evidence that the public sector reduces the gender wage gap.

Occupational Factors: to make the findings purposeful, we have focussed on the occupational variables with significant coefficients for the composition effect or wage structure effect, or both, over a certain range of the distribution. For this reason, we interpret the effects of professional/technical employment, manufacturing and wage-employed agriculture. For the two periods, the results show that the endowment

effect associated with professional/technical and manufacturing employment acted to widen the gender wage gap. Also, manufacturing employment has a wage structure effect that acts to increase the wage gap over the two periods, whereas the professional and technical employment wage structure effect acts to reduce the gender wage gap through the wage structure component. Moreover, while the wage structure component of professional/technical employment was found to be significant, especially in the middle of the wage distribution during the 2003/2004 period, it was the composition effect that was statistically significant at the middle and upper end of the wage distribution during the 2018/2019 period. Conversely, it was the composition effect of manufacturing employment that was found to be statistically significant at every point in the wage distribution during the 2018/2019 period. The net effect shows that professional/technical employment tends to lower the gender wage gap, but more recently the dynamic has changed so that it is now linked to increasing gender wage inequality. Manufacturing employment has a net effect that is associated with an increase in the gender wage gap over the two periods. These results suggest that women are underpaid compared with their male counterparts in these forms of employment.

Figure 4: Explained and unexplained effects of occupational variables on gender wage gap



Source: Author's computations from the Nigeria LSS 2003/2004 and 2018/2019

In 2003/2004, agricultural wage employment reduced the gender wage gap through the composition effect, however, this effect was reversed in 2018/2019. This change can be attributed to the increasing mechanization of agriculture and how men benefit

more than women in terms of wages. The net effect of agricultural employment is to reduce the gender wage gap at all points in the wage distribution during the 2003/2004 period. But for the 2018/2019 period, it reduces the gender wage gap only at the mean and at the 20th, 40th, 50th and 60th quintile. The positive and statistically significant constant terms in the unexplained component of the decomposition represent a wage gap that is not attributable to any of the observed covariates and therefore suggests the presence of wage discrimination in the labour market. Higher values of the constant term in the 2018/2019 period imply that, even recently, wage discrimination has grown.

Summary, Recommendations and Conclusion

Previous studies have tried to examine the gender wage gap in Nigeria using different methods and survey data sets. However, to the best of our knowledge no study has applied an extension of the Oaxaca-Blinder decomposition that relies on recentred influence function (RIF) regressions to analyze gender wage gap at all points along the wage distribution, and over time. In addition, previous studies mostly relied on the mean decomposition and could only ascertain detailed decomposition for factors that explain the gender wage gap at the mean. This canonical approach, rooted in the framework developed by Oaxaca (1973), is sensitive to whether male or female is used as the reference point. But our study was able to obtain a detailed decomposition that can measure the marginal effects of each of the covariates in terms of the composition effect and wage structure effect without being sensitive to the choice of the reference group. The only study that is close to our own is Aderemi and Alley (2019) who used data at one point in time to conduct a static analysis of the gender wage gap using quantile regressions. Our study conducted a temporal analysis using different waves of household surveys to understand how the gender wage gap had changed over time. We could not correct for sample selection due to some limitations associated with the previous literature. While our findings corroborated the findings of other studies on the existence of the gender wage gap, especially at the mean wage, we made some new findings as far as extant literature in Nigeria is concerned.

Our key results are as follows: First, based on the first objective, which is to ascertain if there are significant gender differences along the wage distribution in the Nigerian labour market, we found a considerable gender wage gap in Nigeria both at the mean and at all points on the wage distribution. That is, apart from the mean wage gap that is corroborated by previous studies in Nigeria and other sub-Saharan African countries, the gender wage gap in Nigeria is also prevalent among the lower, middle and upper wage earners. This finding is novel compared to what we already know about wage inequality in Nigeria. Second, on whether there is glass ceiling or sticky floor, another novel finding is that for the 2003/2004 period, contrary to some of the studies (Landmesser, 2019, among others), the wage gap showed an inverted U-shape. That is, the wage gap was bigger in the middle of the distribution than at the bottom or the top, which is evidence against sticky floors or glass ceilings

in Nigeria. However, as time progressed the dynamics of wage inequality changed such that since the 2018/2019 period the gaps have been bigger at the bottom than at the upper end of wage income. In other words, a more recently sticky floor has appeared in the distribution of the gender wage gap in Nigeria. This suggests that when women are in low-paying jobs, men earn much more compared to when they are in top-paying occupations.

Third, to ascertain how gender wage gap and factors explaining it have changed over time in the Nigerian labour market, our findings showed that over the previous 15 years or more, there had been a general decline in the gender wage gap in Nigeria, especially among high-income earners. This means that women in top public sector employment, administrative, executive and professional positions and other high-paying jobs experienced less pay disparity compared to their male counterparts. This may be due to improvements in women's education, a shift into more professional and technical jobs, and greater unionization. All this contributed to reducing the gender wage gap.

Fourth, another finding related to the second and third objectives is that most of the gender wage gap is explained by the wage structure effect rather than the composition effect over the two periods. However, more recently, as depicted by the 2018/2019 results, the composition effect partly significantly accounted for why there was a bigger gap at the bottom of the wage distribution than at the top. Its contribution to the gender wage gap was significantly different from zero, between the 10th and 50th quantile, thereby reinforcing the positive effect of the unexplained component. This implies that it was the returns to characteristics that explained the wage gap over the entire distribution in the 2003/2004 period and not the characteristics of the sexes. Conversely, for the 2018/2019 period the characteristics became a significant component of the wage gap, especially at the lower income. It may be that women at the bottom of the wage distribution have inferior endowments compared to those at the top. For the two periods, we found the constant terms associated with the wage structure effect statistically significant and large. This can be interpreted as a measure of wage discrimination in line with Bhorat and Goga (2013), among others.

On the second objective, the detailed decomposition results showed that factors such as age, urban residence, marital status, education level, especially above secondary level, union membership, public sector employment and occupational factors cannot be ignored, as they exert significant influence on the wage gap. While possessing certain attributes may help women to find well-paying jobs in the labour market in Nigeria, attributes such as education level above secondary, age (which may also serve as a proxy for experience), union membership and location, also increase their negotiating power in the labour market. Some characteristics such as urban residence, marital status, higher education and union membership have remained consistent over time with how they affect gender wage gap, especially through the wage structure effect.

These findings have important implications for the design of effective gender-sensitive policies in Nigeria, especially as it concerns pay differentials at the workplace. The finding that education above the secondary level has been having a significant reducing influence on the gender wage gap through both the composition and wage structure effect since 2003/2004 suggests that efforts should be geared towards promoting higher education qualifications for women, even when they are already in the labour market. In recent years, there has been an increase in the admission of girls and women into degree programmes, and even higher degrees, to Nigerian universities. This level of education can be achieved by making education affordable and the learning environment conducive, with no interruptions, to enable them to complete their studies on time and join the labour market. Women should be encouraged to go into technical and professional and wage employment jobs in agriculture, as well as in the public sector. The private sector should try to implement gender-sensitive policies in the workplace so that the extent of discrimination could be reduced.

Further, women should be given more opportunities in urban employment where wages are higher and the gap is lower. Invariably, there is a need to promote policies that would reduce urban unemployment for women. Union membership is another important factor in reducing the gender wage gap in Nigeria. This, therefore, suggests that women had continued sustaining the momentum seen since 2005 in joining labour unions at the workplace. Finally, based on our findings that certain types of occupation appear to propagate the gender wage gap, policies could aim to increase women's access to high-paying occupations in the public and private sectors.

Our study has made novel findings about the gender wage gap in the Nigerian labour market. However, there are still areas that need to be studied to shed more light on the nature of gender inequality. For example, as richer data sets become available researchers can control for sample selection bias. In addition, statistical agencies should collect labour market data that is more comprehensive (e.g., panel data sets and data that include information on work experience and firm size) to allow for an in-depth analysis of the gender wage gap. Furthermore, the study identified factors that decrease and increase the gender wage gap in Nigeria. Hence, further research is needed to unravel why women are disadvantaged as a result of some of these factors that tend to narrow the wage gap. Finally, future research should focus on why there is gender wage heterogeneity across sectors such as agriculture, manufacturing, public sector, and professional and technical occupations.

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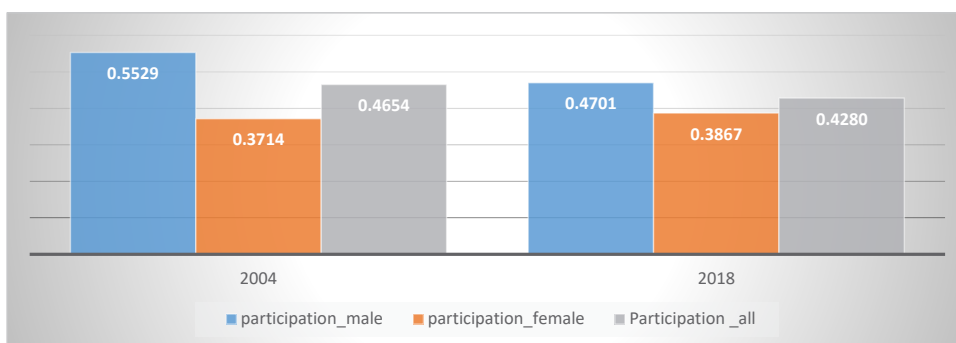
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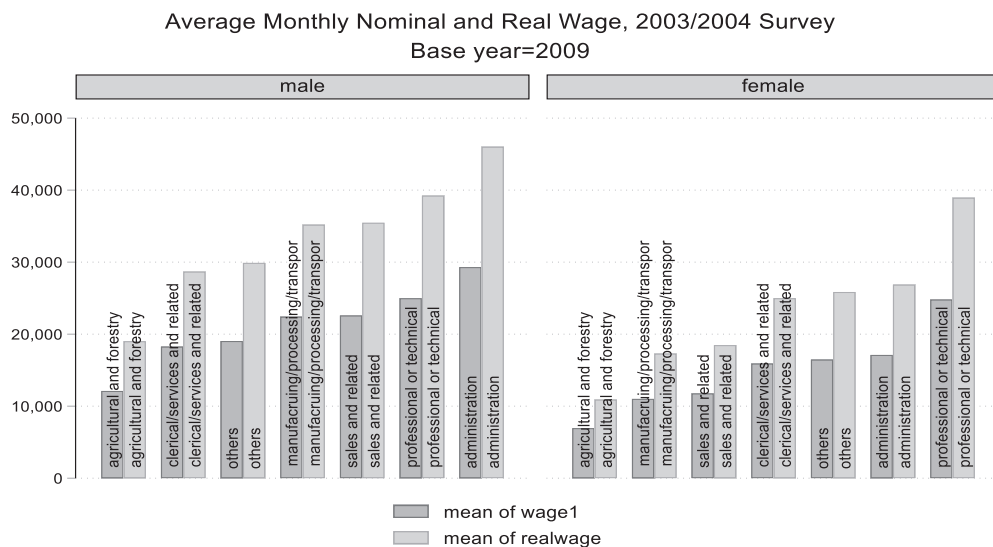
APPENDIX

Figure 1A: Labour force participation rates between 2004 and 2018



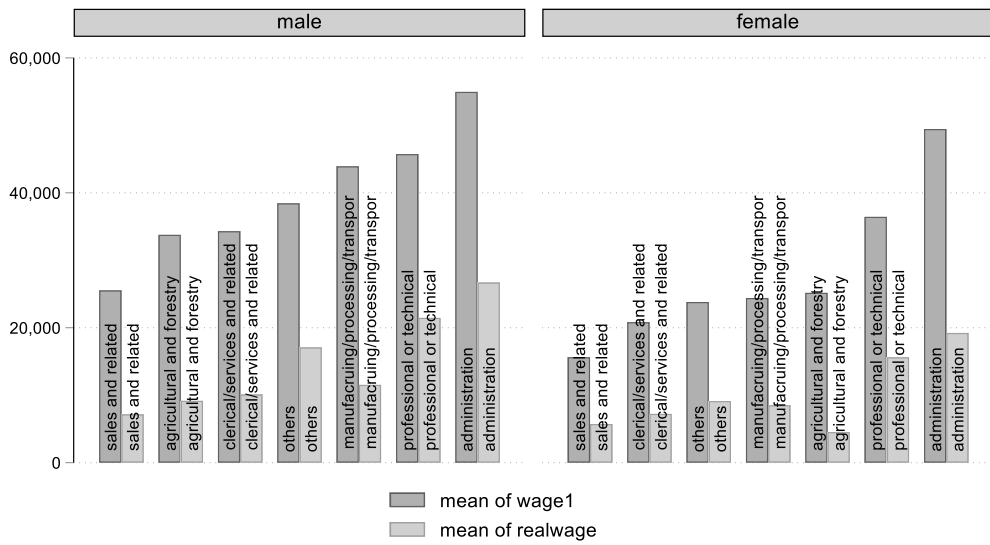
Source: Authors' computation from NBS (2019).

Figure 2A: Average Monthly Nominal and Real Wage



Source: 2003/2004 Nigeria Household Survey, National Bureau of Statistics

**Figure 3A: Average Monthly Nominal and Real Wage, 2018/2019 Survey
Base year= 2009**



Source: 2003/2004 Nigeria Household Survey, National Bureau of Statistics

Table 1A: Detailed decomposition of the gender wage gap, 2003/2004

Composition effect	Mean	q10	q20	q30	q40	q50	q60	q70	q80	q90
Age	0.0380*** (0.000)	0.0327 (0.135)	0.0601** (0.001)	0.0435*** (0.000)	0.0266** (0.004)	0.0323*** (0.000)	0.0351*** (0.000)	0.0305*** (0.000)	0.0306*** (0.001)	0.0400** (0.006)
Urban	-0.0161*** (0.000)	-0.00674 (0.385)	-0.0221** (0.003)	-0.0197*** (0.000)	-0.0203*** (0.000)	-0.0172*** (0.000)	-0.0109** (0.003)	-0.0117** (0.003)	-0.0137** (0.003)	-0.0139* (0.050)
Married	0.0235*** (0.000)	0.0430** (0.002)	0.0386** (0.001)	0.0282*** (0.000)	0.0237*** (0.000)	0.0161** (0.002)	0.0138** (0.006)	0.0178*** (0.001)	0.0163** (0.005)	0.0159 (0.065)
Union	0.00738* (0.035)	0.00180 (0.724)	0.00544 (0.247)	0.00817* (0.017)	0.00742* (0.011)	0.00641* (0.021)	0.00513 (0.079)	0.00586 (0.072)	0.00955* (0.015)	0.00399 (0.512)
None	0.000781 (0.389)	-0.000370 (0.833)	0.000810 (0.608)	0.00130 (0.291)	0.000962 (0.287)	0.000879 (0.264)	0.00164 (0.131)	0.00184 (0.123)	0.00187 (0.131)	0.00170 (0.241)
Primary	0.00232 (0.095)	0.00139 (0.383)	0.00108 (0.426)	0.000976 (0.310)	0.00201 (0.102)	0.00234 (0.082)	0.00269 (0.076)	0.00344 (0.070)	0.00385 (0.070)	0.00339 (0.094)
Secondary	0.00000790 (0.920)	-0.0000461 (0.862)	-0.000142 (0.839)	-0.000149 (0.838)	-0.0000536 (0.841)	0.0000437 (0.842)	0.000117 (0.837)	0.000179 (0.837)	0.000144 (0.837)	0.000199 (0.838)
Above_secondary	0.00637** (0.002)	0.000836 (0.787)	0.00147 (0.591)	0.00237 (0.210)	0.00514** (0.003)	0.00729*** (0.000)	0.0111*** (0.000)	0.0141*** (0.000)	0.0143*** (0.000)	0.0140*** (0.000)
Public_sector	0.00836 (0.096)	0.0186* (0.015)	0.0320*** (0.000)	0.0311*** (0.000)	0.0211*** (0.000)	0.0135** (0.001)	0.0132** (0.003)	0.00545 (0.242)	-0.00714 (0.185)	-0.0172 (0.063)
Professional_technical	0.00118 (0.121)	0.00183 (0.124)	0.00164 (0.145)	0.000769 (0.262)	0.000540 (0.317)	0.000770 (0.170)	0.000907 (0.147)	0.000859 (0.193)	0.000822 (0.274)	0.000189 (0.862)
Administration	0.000786 (0.615)	-0.00270 (0.303)	-0.00143 (0.477)	-0.000575 (0.663)	0.000290 (0.787)	0.000823 (0.403)	0.00117 (0.279)	0.00183 (0.138)	0.00359* (0.030)	0.00622* (0.041)
Clerical_services	-0.00266 (0.424)	0.0110 (0.058)	0.0107* (0.048)	0.00542 (0.168)	0.00114 (0.725)	-0.00390 (0.787)	-0.00826** (0.007)	-0.00953** (0.004)	-0.0157*** (0.000)	-0.0152* (0.011)
Sales_related	-0.0311 (0.084)	-0.0686* (0.022)	-0.0604* (0.034)	-0.0436* (0.037)	-0.0253 (0.125)	-0.0137 (0.343)	-0.0121 (0.415)	-0.00389 (0.805)	-0.00587 (0.751)	-0.0320 (0.304)
Agriculture	-0.0519*** (0.000)	-0.0733*** (0.000)	-0.0853*** (0.000)	-0.0744*** (0.000)	-0.0546*** (0.000)	-0.0456*** (0.000)	-0.0395*** (0.000)	-0.0368*** (0.000)	-0.0323*** (0.000)	-0.0380*** (0.000)
Manufacturing	0.00105 (0.581)	0.00196 (0.567)	0.00330 (0.289)	0.00382 (0.085)	0.00181 (0.305)	0.00188 (0.227)	0.00141 (0.381)	0.000454 (0.792)	-0.00234 (0.230)	-0.00279 (0.365)
Others	0.00649 (0.084)	0.00858 (0.225)	0.00908 (0.164)	0.0113* (0.013)	0.0101** (0.007)	0.00833* (0.013)	0.00764* (0.032)	0.00787* (0.041)	0.00737 (0.107)	-0.000733 (0.917)
North_Central	0.00347 (0.084)	0.0151* (0.013)	0.00650 (0.013)	0.00482 (0.013)	0.00192 (0.007)	0.000774 (0.013)	0.00105 (0.032)	0.00210 (0.041)	-0.00109 (0.107)	-0.00389 (0.917)

p-values in parentheses. * p < 0.05, ** p < 0.01, *** p < 0.001 Source: Authors' computations using NBS (2009) data

Table 1A: Detailed decomposition of the gender wage gap, 2003/2004 continued.

North_East	(0.223) -0.00423 (0.178)	(0.012) -0.0153* (0.044)	(0.249) -0.0222*** (0.001)	(0.202) -0.00740 (0.058)	(0.496) -0.00159 (0.573)	(0.751) -0.000694 (0.779)	(0.668) -0.00252 (0.313)	(0.424) -0.00374 (0.163)	(0.718) -0.00140 (0.648)	(0.390) -0.000329 (0.946)
North_West	(0.172) -0.0172*	(0.0266) -0.0266	(0.0256) -0.0256*	(0.0247**) -0.0247**	(0.0202***) -0.0202***	(0.0131*) -0.0131*	(0.00645) -0.00645	(0.00663) -0.00663	(0.00706) -0.00706	(0.00975) -0.00975
South_East	(0.015) -0.00792	(0.084) 0.00380	(0.041) 0.0113	(0.002) -0.00483	(0.001) -0.00564	(0.011) -0.00464	(0.208) -0.00594	(0.222) -0.00846	(0.252) -0.00442	(0.348) -0.00623
South_South	(0.197) -0.00505**	(0.779) -0.00506	(0.323) -0.00880**	(0.529) -0.00829**	(0.331) -0.00702***	(0.348) -0.00546**	(0.231) -0.00464**	(0.109) -0.00395**	(0.454) -0.00421*	(0.513) -0.00512*
South_West	(0.007) 0.00587	(0.104) 0.01123	(0.006) -0.0131	(0.001) 0.00390	(0.001) 0.00993*	(0.001) 0.00976**	(0.003) 0.0106**	(0.008) 0.00977*	(0.010) 0.00655	(0.038) 0.0209**
Wage structure effect	(0.160) 0.160	(0.136) 0.136	(0.082) 0.082	(0.462) 0.462	(0.015) 0.015	(0.006) 0.006	(0.003) 0.003	(0.011) 0.011	(0.135) 0.135	(0.002) 0.002
Age	-0.139 (0.395)	0.382 (0.221)	0.309 (0.208)	-0.00142 (0.994)	-0.163 (0.323)	-0.123 (0.402)	-0.179 (0.237)	-0.242 (0.113)	-0.476** (0.006)	-0.478 (0.051)
Urban	-0.00510 (0.908)	0.00819 (0.915)	0.0298 (0.638)	-0.112 (0.044)	-0.0624 (0.176)	-0.0468 (0.264)	-0.0801 (0.069)	-0.0130 (0.776)	0.103 (0.848)	-0.0146 (0.849)
Married	0.194* (0.010)	0.0660 (0.643)	0.202 (0.071)	0.278** (0.003)	0.224** (0.004)	0.185** (0.010)	0.221** (0.003)	0.261** (0.001)	0.186* (0.038)	0.305* (0.016)
Union	-0.0163 (0.367)	-0.00244 (0.913)	-0.00715 (0.726)	0.0187 (0.352)	0.000312 (0.986)	-0.00717 (0.672)	-0.0397 (0.066)	-0.0353 (0.157)	-0.0522 (0.116)	-0.0578 (0.203)
None	0.0299* (0.029)	0.0177 (0.513)	0.0555** (0.004)	0.0454** (0.006)	0.0403** (0.003)	0.0297* (0.012)	0.0220 (0.068)	0.0144 (0.238)	0.0256 (0.068)	0.0169 (0.366)
Primary	-0.0600 (0.070)	-0.0551 (0.360)	-0.0978* (0.031)	-0.0218 (0.573)	-0.0399 (0.212)	-0.0534 (0.063)	-0.0506 (0.092)	-0.0391 (0.202)	-0.0414 (0.233)	-0.0663 (0.168)
Secondary	-0.0138 (0.579)	0.0569 (0.200)	-0.0188 (0.578)	-0.0255 (0.382)	-0.0475 (0.051)	-0.0430 (0.054)	-0.0346 (0.148)	-0.0281 (0.261)	-0.0171 (0.553)	-0.00123 (0.974)
Above_secondary	-0.0130 (0.548)	-0.0330 (0.212)	-0.0328 (0.113)	-0.0436* (0.023)	-0.0186 (0.260)	-0.000682 (0.965)	0.00505 (0.788)	0.00826 (0.686)	-0.0123 (0.625)	0.00146 (0.967)
Public_sector	-0.0798** (0.002)	-0.00292 (0.924)	0.0147 (0.629)	-0.0471 (0.137)	-0.0623* (0.024)	-0.0998*** (0.000)	-0.129*** (0.000)	-0.105** (0.003)	-0.0789 (0.068)	-0.0786 (0.165)
Professional_technical	0.0121 (0.520)	0.0133 (0.542)	-0.000855 (0.963)	-0.00894 (0.614)	-0.00562 (0.718)	0.00461 (0.764)	0.0174 (0.354)	0.0107 (0.689)	-0.00707 (0.828)	0.0494 (0.283)
Administration	0.00280 (0.475)	-0.00502 (0.339)	-0.000237 (0.957)	0.00326 (0.428)	0.00351 (0.310)	0.00459 (0.214)	0.00357 (0.394)	0.00156 (0.759)	0.00458 (0.509)	-0.00155 (0.878)
Clerical_services	0.0102 0.102	0.0120 0.120	0.0240 0.240	0.0107 0.107	0.00603 0.0603	-0.00844 -0.00844	-0.0000893 -0.0000893	-0.000814 -0.000814	0.0164 0.164	0.0339 0.339

Table 1A: Detailed decomposition of the gender wage gap, 2003/2004 continued

Sales_related	(0.567)	(0.470)	(0.124)	(0.470)	(0.658)	(0.525)	(0.995)	(0.973)	(0.560)	(0.384)
	0.0805	0.0513	0.0541	0.0406	0.0309	0.0340	0.0861	0.0703	0.116	0.192
	(0.144)	(0.380)	(0.273)	(0.382)	(0.451)	(0.391)	(0.059)	(0.305)	(0.153)	(0.096)
Agriculture	0.0200	0.0106	-0.0392	-0.0405	-0.000171	0.000972	0.00948	0.0213	0.0255	0.0198
	(0.666)	(0.867)	(0.416)	(0.345)	(0.996)	(0.978)	(0.805)	(0.708)	(0.704)	(0.833)
Manufacturing	0.00867	-0.00914	-0.00231	0.00977	0.00459	0.0136	0.0277	0.0212	0.0154	0.0169
	(0.579)	(0.649)	(0.888)	(0.541)	(0.740)	(0.297)	(0.053)	(0.274)	(0.489)	(0.587)
Others	-0.00134	0.0000471	-0.000302	-0.000539	-0.000646	-0.000903	-0.00168	-0.00121	-0.00169	-0.00247
	(0.335)	(0.919)	(0.543)	(0.366)	(0.314)	(0.217)	(0.123)	(0.505)	(0.430)	(0.423)
North_Central	0.0231	0.0310	0.0261	0.0328*	0.0325*	0.0214	0.0131	0.0172	0.0196	0.0174
	(0.067)	(0.187)	(0.160)	(0.047)	(0.015)	(0.071)	(0.283)	(0.156)	(0.186)	(0.395)
North_East	-0.00523	0.0155	-0.00519	0.00539	0.00263	0.00137	-0.00140	-0.00295	-0.00981	-0.0199
	(0.496)	(0.351)	(0.643)	(0.551)	(0.718)	(0.827)	(0.835)	(0.677)	(0.263)	(0.115)
North_West	0.000167	0.00426	0.00363	0.00565	0.00210	0.00115	0.000603	0.000837	-0.00487	-0.00361
	(0.974)	(0.662)	(0.616)	(0.351)	(0.672)	(0.797)	(0.903)	(0.865)	(0.436)	(0.691)
South_East	0.00331	-0.0872*	-0.0429	-0.0607*	-0.0378	-0.0132	0.0114	0.0110	0.0240	0.0804*
	(0.877)	(0.041)	(0.189)	(0.025)	(0.083)	(0.496)	(0.578)	(0.605)	(0.347)	(0.033)
South_South	-0.0289	-0.0583	-0.0136	-0.0677*	-0.0649**	-0.0638**	-0.0470*	-0.0449*	-0.0138	0.0121
	(0.227)	(0.220)	(0.687)	(0.016)	(0.005)	(0.002)	(0.034)	(0.605)	(0.595)	(0.735)
South_West	0.000714	-0.0347	-0.00242	-0.0180	0.00560	0.0181	0.00886	0.00315	0.0493	-0.00605
	(0.979)	(0.464)	(0.949)	(0.600)	(0.845)	(0.485)	(0.744)	(0.909)	(0.130)	(0.892)
_cons	0.471*	0.0822	0.0544	0.568*	0.725***	0.715***	0.628**	0.482*	0.653*	0.440
	(0.036)	(0.825)	(0.846)	(0.019)	(0.000)	(0.000)	(0.001)	(0.047)	(0.020)	(0.264)
<i>N_Male</i>	5318									
<i>Female</i>	2796									

p-values in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors' computations using NBS (2009) data

Table 2A: Detailed decomposition of the gender wage gap, 2018/2019

Composition effect	Mean	q10	q20	q30	q40	q50	q60	q70	q80	q90
Age	0.0161*** (0.000)	0.00930 (0.350)	0.0138* (0.044)	0.0116+ (0.052)	0.0144** (0.007)	0.0184*** (0.001)	0.0191*** (0.000)	0.0247*** (0.000)	0.0214*** (0.000)	0.0174** (0.004)
Urban	-0.0135*** (0.000)	-0.0190** (0.005)	-0.0147** (0.003)	-0.0111* (0.014)	-0.00922* (0.027)	-0.0130** (0.003)	-0.0125** (0.004)	-0.0125** (0.005)	-0.0161** (0.001)	-0.0185** (0.001)
Married	0.0291*** (0.000)	0.0488*** (0.000)	0.0403*** (0.000)	0.0375*** (0.000)	0.0333*** (0.000)	0.0329*** (0.000)	0.0260*** (0.000)	0.0201** (0.002)	0.0156* (0.022)	0.0159* (0.024)
Union	-0.00340* (0.043)	-0.00438+ (0.066)	-0.00369+ (0.061)	-0.00371+ (0.056)	-0.00330+ (0.060)	-0.00473* (0.043)	-0.00320+ (0.064)	-0.00306+ (0.071)	-0.00251 (0.107)	-0.00297+ (0.099)
None	-0.0119** (0.000)	-0.0177** (0.004)	-0.0173** (0.000)	-0.0159*** (0.000)	-	-	-	-0.0110*** (0.000)	-	-
Primary	-0.00405** (0.002)	-0.00133 (0.652)	-0.00156 (0.465)	-0.00279 (0.140)	-0.00448* (0.010)	-0.00405* (0.015)	-	-0.00516** (0.002)	-0.00560** (0.001)	-
Secondary	0.00167 (0.440)	0.00921+ (0.097)	0.00811* (0.040)	0.00626+ (0.069)	0.00363 (0.226)	0.00116 (0.685)	0.000252 (0.929)	-0.00107 (0.697)	-0.00362 (0.217)	0.00596*** (0.000)
Above_Secondary	-0.0596*** (0.000)	-	-0.0548*** (0.000)	-0.0591*** (0.000)	-	-	-	-0.0674*** (0.000)	-0.0651*** (0.000)	-0.0688*** (0.000)
Public_Sector	-0.0244*** (0.000)	-0.0334** (0.000)	-0.0366*** (0.000)	-0.0304*** (0.000)	-	-	-	-0.0201** (0.000)	-0.0164* (0.000)	-0.00510 (0.483)
Professional_Technical	0.0536*** (0.000)	0.0332 (0.217)	0.0312 (0.112)	0.0516** (0.002)	0.0551*** (0.000)	0.0735*** (0.000)	0.0791*** (0.000)	0.0760*** (0.000)	0.0609*** (0.000)	0.0381* (0.050)
Administration	-0.000722 (0.653)	-0.00418 (0.212)	-0.00181 (0.440)	-0.00204 (0.342)	-0.00168 (0.395)	0.000985 (0.621)	0.00126 (0.540)	0.00106 (0.628)	0.000235 (0.924)	0.000705 (0.804)
Clerical_Services	-0.000946 (0.330)	-0.00248 (0.323)	-0.00203 (0.250)	-0.00243 (0.110)	-0.00156 (0.225)	-0.000790 (0.511)	-0.000570 (0.625)	-0.000649 (0.577)	-0.000303 (0.806)	-0.000163 (0.900)
Sales_Related	0.000347 (0.408)	0.000943 (0.417)	0.000625 (0.414)	0.000406 (0.429)	0.000125 (0.579)	0.000311 (0.422)	0.000253 (0.432)	0.000181 (0.461)	0.000180 (0.461)	0.0000764 (0.642)
Agriculture	0.00714*** (0.000)	0.0101+ (0.051)	0.00647+ (0.078)	0.0135*** (0.000)	0.00285 (0.277)	0.00415+ (0.096)	0.00617* (0.013)	0.00515* (0.038)	0.00627* (0.022)	0.00500+ (0.072)
Manufacturing	0.0683*** (0.000)	0.113*** (0.000)	0.0986*** (0.000)	0.0937*** (0.000)	0.0823*** (0.000)	0.0696*** (0.000)	0.0594*** (0.000)	0.0471*** (0.000)	0.0409*** (0.000)	0.0322** (0.002)
Others	-0.00114 (0.267)	0.000418 (0.852)	-0.000992 (0.577)	-0.00295+ (0.066)	-0.00156 (0.251)	-0.000533 (0.691)	-0.000813 (0.529)	-0.000210 (0.877)	-0.000634 (0.660)	-0.00161 (0.271)

Table 2A: Detailed decomposition of the gender wage gap, 2018/2019 continued

North_Central	0.00134 (0.143)	-0.000232 (0.900)	0.000372 (0.795)	0.000603 (0.643)	0.00183 (0.144)	0.00190 (0.132)	0.00206 (0.104)	0.00222+ (0.097)	0.00275+ (0.068)	0.00107 (0.509)
North_East	-0.0143***	-0.0207***	-0.0164***	-0.0103*	-0.0132**	0.0151***	0.0149***	-0.0133***	-0.00901*	-0.00644+
North_West	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.081)
	-0.0117***	-0.0113	-0.0130*	-0.0103*	-0.0132**	0.0182***	0.0161***	-0.0138**	-0.0127**	-0.00607
South_East	(0.000)	(0.151)	(0.020)	(0.034)	(0.003)	(0.000)	(0.000)	(0.001)	(0.006)	(0.252)
	-0.00540**	-0.00596*	-0.00776**	-0.00712**	-	-	-	-0.00686**	-0.00592*	-0.00142
South_South	(0.002)	(0.036)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.010)	(0.452)
	-0.00842***	-0.00786*	-	-	-	-	-	-	-0.00771**	-0.00779**
South_West	(0.000)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.005)
	0.0000882	-0.00358	0.00161	0.00429	0.000574	-0.00138	0.00187	0.00115	0.00114	0.00262
	(0.970)	(0.476)	(0.676)	(0.220)	(0.855)	(0.658)	(0.549)	(0.724)	(0.752)	(0.518)
Wage structure effect										
Age	-0.290**	-0.113	-0.104	-0.400*	-0.494**	-0.408*	-0.274+	-0.236	-0.189	-0.364+
	(0.009)	(0.526)	(0.517)	(0.027)	(0.004)	(0.016)	(0.087)	(0.147)	(0.243)	(0.059)
Urban	-0.00612	0.0521	-0.0177	-0.0779	-0.0423	-0.0183	0.0108	0.0326	0.0523	-0.0142
	(0.842)	(0.322)	(0.702)	(0.148)	(0.395)	(0.710)	(0.816)	(0.512)	(0.303)	(0.816)
Married	0.138***	0.175**	0.226***	0.211**	0.202**	0.141*	0.143*	0.108+	0.0882	0.0841
	(0.000)	(0.003)	(0.000)	(0.001)	(0.001)	(0.021)	(0.014)	(0.064)	(0.131)	(0.222)
Union	-0.00629	0.0427	0.0475	0.00989	-0.0294	0.0280	0.0243	-0.0491	-0.0518	-0.0163
	(0.838)	(0.278)	(0.216)	(0.846)	(0.555)	(0.584)	(0.620)	(0.342)	(0.304)	(0.780)
None	0.00313	0.00454	-0.000774	0.000803	0.00273	0.00186	0.00373	0.00340	0.00130	-0.000900
	(0.425)	(0.581)	(0.910)	(0.991)	(0.653)	(0.743)	(0.479)	(0.450)	(0.760)	(0.834)
Primary	0.0203*	0.0206	0.0204	0.0365*	0.0347*	0.0362**	0.0303**	0.0185+	0.0122	0.00955
	(0.010)	(0.193)	(0.124)	(0.015)	(0.011)	(0.005)	(0.009)	(0.054)	(0.119)	(0.206)
Secondary	-0.0154	-0.0464	-0.0282	-0.0174	-0.0276	-0.00241	-0.0118	-0.0000951	0.0110	0.00466
	(0.427)	(0.232)	(0.385)	(0.632)	(0.393)	(0.937)	(0.676)	(0.997)	(0.637)	(0.848)
Above_Secondary	-0.131***	-0.107+	-0.0484	-0.162**	-0.179***	-0.213***	-0.198***	-0.150**	-0.101*	-0.0420
	(0.000)	(0.075)	(0.357)	(0.006)	(0.001)	(0.000)	(0.000)	(0.001)	(0.021)	(0.385)
Public_Sector	-0.126**	0.0307	0.0249	-0.186**	-0.246***	-0.313***	-0.292***	-0.142*	-0.0955	-0.121+
	(0.002)	(0.582)	(0.639)	(0.006)	(0.000)	(0.000)	(0.000)	(0.026)	(0.115)	(0.081)
Professional_Technical	0.000276	-0.0103	-0.0263	0.0253	0.0601	0.00521	-0.0202	-0.00774	0.000893	0.0243
	(0.994)	(0.876)	(0.648)	(0.689)	(0.303)	(0.924)	(0.689)	(0.867)	(0.985)	(0.653)
Administration	0.00161	-0.00486	-0.00228	0.00592	0.00856	0.0125	0.0181	-0.00489	-0.0135	0.0143
	(0.876)	(0.746)	(0.859)	(0.702)	(0.574)	(0.441)	(0.258)	(0.777)	(0.459)	(0.541)

Table 2A: Detailed decomposition of the gender wage gap, 2018/2019 continued

Clerical_Services	-0.00322 (0.745)	0.00191 (0.915)	-0.00675 (0.664)	-0.0164 (0.373)	-0.0102 (0.541)	-0.00841 (0.583)	-0.00552 (0.692)	-0.00547 (0.670)	-0.000125 (0.992)	-0.00689 (0.613)
Sales_Related	-0.00901+ (0.086)	-0.0333** (0.006)	-0.0182+ (0.071)	-0.00739 (0.509)	0.00167 (0.859)	-0.0112 (0.179)	-0.00495 (0.462)	-0.00533 (0.336)	-0.00767 (0.134)	-0.00608 (0.245)
Agriculture	-0.00880 (0.247)	0.00302 (0.782)	-0.00984 (0.333)	-0.00339 (0.799)	-0.0288* (0.032)	-0.0113 (0.362)	-0.0169 (0.144)	-0.00273 (0.797)	0.0102 (0.287)	0.00412 (0.691)
Manufacturing	0.00725 (0.182)	0.0122 (0.134)	0.0114 (0.147)	0.00517 (0.619)	0.00779 (0.443)	0.0109 (0.269)	0.00934 (0.282)	0.00741 (0.372)	0.0129+ (0.067)	0.00432 (0.588)
Others	0.00290 (0.423)	0.00753 (0.226)	0.00672 (0.210)	0.00229 (0.685)	0.00171 (0.745)	0.00210 (0.666)	0.00123 (0.781)	0.00171 (0.648)	-0.00181 (0.650)	-0.00193 (0.659)
North_Central	-0.0104 (0.397)	-0.0190 (0.333)	-0.0117 (0.494)	-0.0105 (0.604)	-0.0193 (0.312)	0.00608 (0.750)	-0.00221 (0.904)	-0.00782 (0.687)	-0.00293 (0.883)	-0.00339 (0.887)
North_East	0.00274 (0.640)	-0.0132 (0.209)	-0.0165+ (0.054)	-0.00308 (0.756)	-0.00110 (0.902)	0.0125 (0.221)	0.0121 (0.218)	0.0136 (0.144)	0.0119 (0.193)	0.0176* (0.037)
North_West	-0.00342 (0.580)	0.0257* (0.017)	0.0198* (0.016)	0.00743 (0.357)	-0.00574 (0.443)	-0.0133+ (0.099)	-0.0211** (0.010)	-0.0181+ (0.054)	-0.0222* (0.032)	-0.0144 (0.278)
South_East	0.0211+ (0.057)	-0.00190 (0.920)	0.0256 (0.135)	0.0395* (0.049)	0.0441* (0.014)	0.0191 (0.279)	0.0301+ (0.080)	0.0139 (0.440)	0.0285 (0.127)	0.0301 (0.155)
South_South	-0.0191 (0.119)	-0.0160 (0.447)	-0.00129 (0.943)	-0.0193 (0.360)	-0.00281 (0.887)	-0.0321+ (0.099)	-0.0212 (0.254)	-0.0341+ (0.083)	-0.0223 (0.277)	-0.0507+ (0.065)
South_West	0.00592 (0.649)	-0.00260 (0.902)	-0.0273 (0.162)	-0.0319 (0.168)	-0.00771 (0.721)	0.00330 (0.876)	0.0151 (0.442)	0.0382+ (0.057)	0.0230 (0.257)	0.00459 (0.858)
_cons	0.750*** (0.000)	0.321 (0.156)	0.329+ (0.078)	0.918*** (0.000)	1.158*** (0.000)	1.050*** (0.000)	0.822*** (0.000)	0.633*** (0.000)	0.466** (0.003)	0.570** (0.002)
N Male	4097									
Female	1834									

p-values in parentheses.
+ *p* < 0.10, * *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001
Source: Authors' computations using NBS (2021) data



Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research

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